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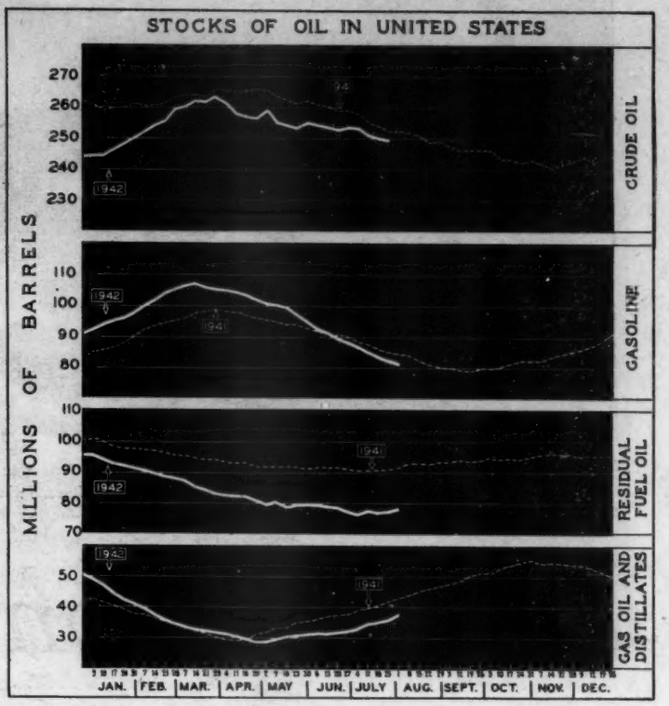
Trends

Reduction in Motor Fuel Demands Less Than Expectations



PROBLEMS incidental to the production and transportation of adequate supplies of distillate and residual fuel oils have been outlined on this page from time to time in recent months. Over the past week there have been additional developments out of Washington and within the petroleum industry which reflect the difficulties ahead in furnishing homes, industry, public utilities and marine operations, as well as the military, with their minimum fuel requirements.

CRUDE PRODUCTION *3,392,615 bbl. daily average—down 327,300 bbl. One year ago 3,690,870 bbl.*

CRUDE STOCKS *249,262,000 bbl. as of July 25—down 1,243,000 bbl. One year ago 252,728,000 bbl.*

GASOLINE STOCKS *81,324,000 bbl. as of Aug. 1 — down 957,000 bbl. One year ago 84,668,000 bbl.*

RESIDUAL FUEL-OIL STOCKS *78,383,000 bbl. as of Aug. 1—up 567,000 bbl. One year ago 92,197,000 bbl.*

GAS OIL AND DISTILLATES *37,530,000 bbl. as of Aug. 1—up 1,564,000 bbl. One year ago 43,307,000 bbl.*

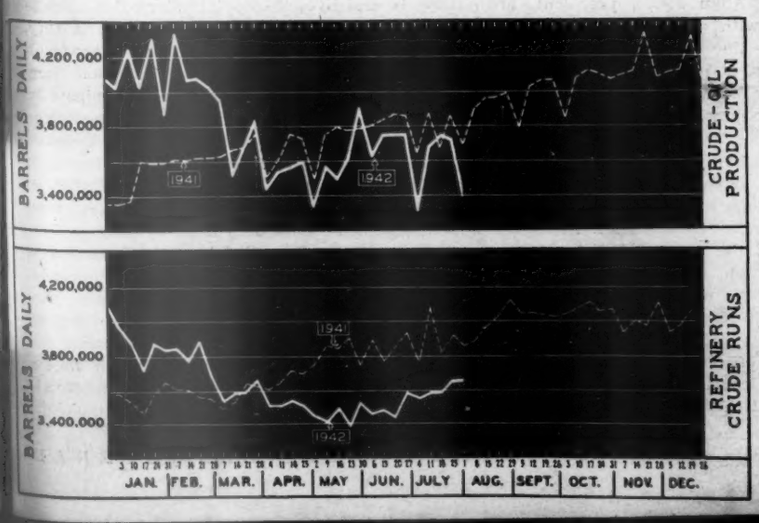
REFINERY RUNS *3,672,000 bbl. daily week ended Aug. 1—up 14,000 bbl. One year ago 3,868,000 bbl.*

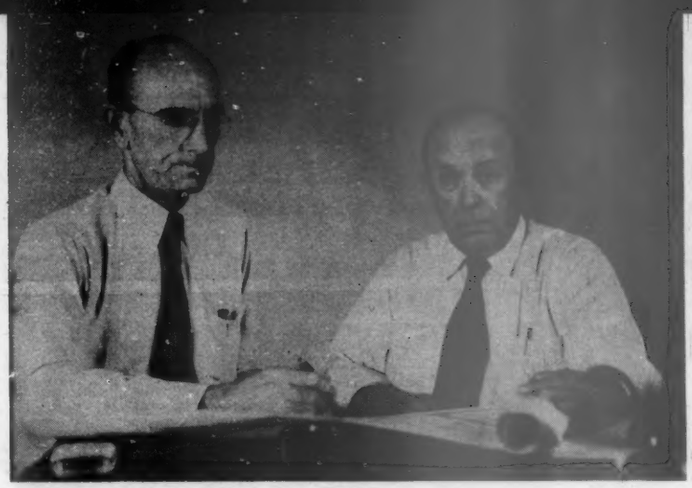
Many connected with the government agencies had assumed earlier in the year that the problem of supplying all grades of fuel oils during the fall and winter months would be simplified through the reduced demands for motor fuels, to be brought about by transportation curtailments and restrictions in the use of rubber. It is now apparent that the motor-fuel demands over the remainder of the year will be substantially greater than was expected. The rationing programs in effect for several weeks in the eastern area were projected to reduce domestic demands in that area by 50 per cent, and 33 1/3 per cent in Washington and Oregon. Gasoline-tax reports for May and June and part information in regard to July reveal that the actual reductions in the affected states ran for short of those goals. Furthermore, information based on state gasoline-tax reports do not fully reveal the trends in motor-fuel sales because they do not include the domestic sales for military use which have mounted steadily. For example a large distributor in five southwestern states reported that the decline in July gasoline sales through its stations varied from 15 to 20 per cent. This was entirely due to the reduced use of cars because of the rubber shortage as gasoline rationing is not compulsory in that area. However, motor-fuel shipments of this company in the five states were greater than in July 1941 because its sales to camps and other Army and Navy units more than offset the decline in station gallonage. The position of the company is not exceptional in that area and comparable conditions exist in many other parts of the country. This situation accounts for the fact that the government estimates that total motor-fuel demands in August will be only 18 per cent under August of last year.

This development in effect means that refiners generally cannot make further reductions in their gasoline yields with offsetting increases in the percentage recoveries of several grades of fuel oils. Furthermore, under the present rationing program there will not be the reductions in the gasoline transportation facilities required to expand the movement of distillate and fuel oils.

DAILY AVERAGE PRODUCTION FOR WEEK

	Aug. 1 crude oil	Aug. OPC quota all oils	July 25 crude oil
Arkansas	72,500	81,600	72,350
California	680,250	767,200	698,750
Colorado	6,380	7,200	6,160
Eastern fields	91,250	110,000	98,750
Illinois	270,855	289,300	269,245
Indiana	17,960	20,600	19,200
Kansas	280,050	281,900	283,700
Louisiana	330,800	332,600	324,145
North Louisiana	*96,200*	.....	*95,100*
Louisiana Gulf Coast	*234,600*	.....	*229,045*
Michigan	62,500	66,800	60,100
Mississippi	82,000	50,000	75,850
Montana	22,310	22,700	20,980
Nebraska	3,600	4,100	3,575
New Mexico	88,430	97,300	87,345
Oklahoma	383,000	415,500	380,900
Texas	906,550	1,396,700	1,224,865
East Texas	*218,050*	.....	*293,055*
West Texas	*138,200*	.....	*211,540*
North Central Texas	*139,100*	.....	*139,105*
East Central Texas	*74,850*	.....	*87,095*
Texas Panhandle	*65,800*	.....	*84,910*
Texas Gulf Coast	*221,250*	.....	*343,265*
Southwest Texas	*49,300*	.....	*65,895*
Wyoming	94,180	95,000	94,000
Total United States	3,392,615	4,038,500	3,719,915
Total production, January 1-August 1, 1942			801,404,000 bbl.
Same period last year			784,417,680 bbl.





Left: Maj. A. N. Horne, vice president and general superintendent, former manager of Empire Pipe Line Co., and B. E. Hull, vice president and general manager, and president, Texas Pipe Line Co. Right: Oscar Wolfe, chief engineer of lines, former production engineer, Texas Co., and H. M. Lingle, purchasing agent, formerly with Humble Pipe Line Co., members of the staff of War Emergency Pipelines, Inc., at headquarters office, Little Rock, Ark.

Construction Starts on 24-in. Texas-Illinois Crude-Oil Line

By PAUL REED

LITTLE ROCK, Ark.—This week when rights-of-way are being acquired, ground cleared and when stringing, ditching, and welding operations are starting for the construction of War Emergency Pipelines, Inc.'s 24-in. crude-oil line from East Texas to Illinois and Indiana, it is recognized that finally the most important project ever contemplated by the pipe-line industry is now actually under way. The building of this artery as the first link in a system to supply the East Coast holds public attention as one of the dramatic events of this war period. After overcoming objections repeatedly raised against it, proponents in the Government and the industry are succeeding in converting the project from the status of a daring idea into that of a material fact.

From the beginning of extended submarine activities by Axis Powers in 1940, it was clear that such a line would be necessary in order to relieve tankers from Gulf Coast-East Coast service even before they were sunk on a large scale along the Atlantic Coast. Now, with all tankers chartered by the War Shipping Board, oil companies can depend on sea-borne transportation only to a limited extent. A large number of tankers are supplying military and naval operations in distant parts of the world, where they are frequently held for prolonged periods because of the need for floating storage. The few tankers remaining in coastwise service have their efficiency reduced to 50 to 60 per cent by protective measures. Railroad transportation is expensive and is probably near its peak. The possibilities of barge transportation in this emergency have probably been exaggerated. The big line from Texas is the only sound economical means for continuously supplying the East Coast area.

Emergency Measures

Now that the project is advanced to the construction stage answers can be given to a number of questions which are being raised: How was it possible to finally get government approval? Why was steel selected for making the pipe instead of substitute materials? How could the steel be spared from the war program? What are the principal construction features? Why is it being built to Norris City, Ill.? Why is the line not going to Salem, Ill.? What kind of an organization is building it? Who is responsible for getting the Government to undertake the project?

Credit for inaugurating the project is given to long study and persistent efforts of committees and officials of OPC, PIWC, WPB and RFC, including Coordinator Harold L. Ickes, Ralph K. Davies, J. R. Parten, Alton B. Jones, W. R. Finney, Jesse Jones, Donald Nelson, Wayne Johnson, and T. E. Swigart. Much was done in clearing the way for acceptance of recommendations by the preparation of a comprehensive report.

The line is being built for War Emergency Pipelines, Inc., a nonprofit engineering, administrative and construction organization which is acting for and in behalf of Defense Plant Corp., a subsidiary of RFC which will own the line lock, stock and barrel. It is anticipated that War Emergency Pipelines, Inc., will operate the system after completion. This organization, called Wepinc at the Little Rock headquarters, is directed by officials drawn from major-company pipe-line organizations because of special qualifications. The major companies contributing personnel will not charge a fee for assistance rendered during the construction nor will they profit by operation of the line after it is finished.

Construction Organization

Activities of W. Alton Jones, president, are concerned largely with contacts in Washington. The building of the line is entirely in the hands of a staff established at headquarters in the Rector Building, Little Rock, Ark., which is headed by B. E. Hull, vice president and general manager, president, Texas Pipe Line Co. Major A. N. Horne has been released by the Army to become vice president and general superintendent; formerly he was manager of Empire Pipe Line Co. Legal affairs are handled by Charles I. Thompson, general counsel, of the firm of Ballard, Spahr, Andrews, and Ingersoll, who will continue to be located in Philadelphia where he will have contacts with officials in New York and Washington. Brady Cole, associate general counsel, is located at the Little Rock office during this time when he is practically on leave from the firm of Baker, Botts, Andrews and Wharton, of Houston, Tex. J. W. Cason, from Standard Oil Co. of Louisiana, is serving as treasurer and comptroller. H. M. Lingle comes from Humble Pipe Line Co. to be purchasing agent.

Oscar Wolfe, formerly chief engineer, production department of Texas Co., is chief engineer of lines. L. M. Goldsmith, chief engineer, Atlantic Refining Co., is chief engineer of pumps and terminals; his services have been donated for station design; he will come to the project from Philadelphia when occasion requires.

The advisory engineering committee consists of W. R. Finney, Standard Oil Co. of New Jersey; L. M. Goldsmith, and C. H. Kountz, Sinclair Refining Co. Charles P. Cathers is supervising engineer for Defense Plant Corp.

Authorization for Steel Pipe

Division superintendents are O. R. Burden, who has been a contractor at Wichita Falls, Tex., and George A. Peterkin, vice president, Latex Construction Co., Houston, Tex., who is entering on his duties in the Longview, Tex.-Newport, Ark., section this week; he is subject to assignment to active duty in the Air Force Reserve.

R. E. Harrell comes from Plantation Pipe Line Co. to be chief right-of-way and claim agent. E. C. Lind, formerly with Missouri Pacific Railroad, serves as manager of railroad traffic.

Now that more than 100 miles of 24-in. has already been delivered to points along the 550-mile route between Longview, Tex., and Norris City, Ill., and five contractors' gangs are at work on the right-of-way, it is of interest to note how this project for laying the heaviest steel pipe ever used suddenly came to life only a few weeks ago when it was widely regarded as a dead issue.

The Army, Navy and the Munitions Board at that time offered proponents of the project 137,500 tons of steel provided that this could be utilized for a big line between July and November 4. This offer was made after officials of the Government and the oil industry had prepared a comprehensive report clearly presenting the reasons why a large-diameter line from East Texas to the New York-Philadelphia refining areas is necessary for national wartime needs. With that much steel a 24-in. line could be carried only as far as Norris City, Ill. A decision had to be made quickly. While

it was disappointing that the line could not be built all the way to the East Coast, it was concluded that half a loaf was better than none and the offer was accepted in the hope that later on additional steel would be furnished for completing the project. Although there have been hopes that additional steel might be forthcoming in 1942, at present it does not seem reasonable to expect that the remaining leg of the line can be built until next year.

When it is completed as far as Norris City with branches to Illinois Pipe Line at Enfield, Ill., and to a barge terminal at Mount Vernon, Ind., the system will aid materially in reducing transportation costs through the shortening of the tank-car haul. It is reported that tank cars are wearing out rapidly and that if the line were not built it would be necessary to build more tank cars. The situation existing on completion to Norris City and vicinity will be similar to the one 35 years ago when new pipe-line construction furnished transportation for Oklahoma crude, first to Dallas, Tex., whence this crude went by tank car to the Gulf Coast before facilities were extended to Corsicana and later were completed to the Gulf Coast.

It is recognized that to get full economic benefit, the War Emergency Pipelines project should be completed all the way to the East Coast. When the project was conceived a year ago, plans called for routing the line northeastward via Salem, Ill. Since then plans were modified to conform with changes in the supply situation.

Incidentally, it should be mentioned that steel used for the big line does not interfere with steel requirements for making goods or articles essential for war needs or the lend-lease program.

Proposals Thoroughly Investigated

Preliminary to the acceptance of the project by the Government, OPC with the advice of pipe-line company men patiently and thoroughly investigated proposals for making the pipe out of substitute materials including concrete, glass, wood, fiber, plastic and reinforced fabric. Rubber pipe was even urged. In every case it was impossible to meet working conditions without the use of some supplemental critical materials such as copper and steel.

The 24-in. steel pipe for the big line is Grade B, A.P.I. standard specification, weighing 94.62 lb. per foot with ⅜-in. wall thickness. From Norris City, Ill., there will be a branch of 14-in. pipe to Mount Vernon, Ind., and 6 miles of 10-in. to Enfield, Ill. Pipe will be coated with enamel and wrapped with asbestos felt for its entire length. There will be a total of 10 stations including the initial pump station which will probably be located south of Longview, Tex., and the terminal at Norris City, Ill. The main pumping units will consist of simple centrifugal pumps direct connected to 1,500-hp. motors. Operating at 750-775 lb. pressure, 300,000 bbl. daily will be moved through the line. There is a possibility that in addition to the regular crude shipments, batches of fuel oil may be transported. It is believed that the Longview-Norris City line will not cost more than $35,000,000.

After the war is over the prospects are good for the big line continuing as an economic carrier of oil even though shipments should drop from 300,000 bbl. to 150,000 to 200,000 bbl. daily. In the postwar period the line's potentialities should be taken into consideration in planning tanker construction. A tanker fleet does have flexibility which has advantages in the operation of a major company. But cost of moving oil through the big line will be so low that it will be able to compete with tankers even under peacetime conditions. There appears to be no need for converting it into a natural-gas line after the war in order to utilize it.

Gen. J. C. Horta Barbosa, president, National Petroleum Council of Brazil, and staff, visiting the Kilgore pump station of Magnolia Pipe Line Co. in East Texas on a tour of oil operations conducted by the state department of the United States Government and Magnolia officials. The men are, left to right: Leslie A. Webb, U. S. State Department; Maj. Iba Meirelles, secretary, National Petroleum Council of Brazil; General Barbosa; J. E. Brantly, president, Drilling & Exploration Co., Dallas, Tex., and Los Angeles, Calif.; Lester H. True, assistant manager, Magnolia Pipe Line Co.; Dr. Alfonso Alvin, engineer, National Petroleum Council of Brazil; L. G. White, chief engineer, Kilgore station; M. J. McLaughlin, vice president and manager of production, Magnolia Petroleum Co.; E. N. Wilson, general superintendent, production department, Magnolia Petroleum Co.; Lee Hancock, district superintendent, East Texas, Louisiana and Arkansas, Magnolia Pipe Line Co.; J. Ben Critz, vice president and general manager, Chamber of Commerce, Dallas, Tex.; M. J. Norrell, manager of industrial relations, Magnolia Petroleum Co.

This Week...

TRANSPORTATION.—Construction starts on War Emergency Pipelines, Inc.'s 24-in. crude-oil line from East Texas to Illinois and Indiana. Project hailed as most important ever undertaken by pipe-line industry. . . . Oil handled by interstate pipe-line companies increased about 16 per cent during first quarter of year. . . . Tank-car shipments of petroleum to East Coast reaches new high of 800,100 bbl. daily. . . . Joint Petroleum Board created by Army and Navy to supply overseas oil requirements.

PRIORITIES.—Plans for an equipment and materials inventory survey among oil and supply companies formulated at Houston meeting of materials section, District 3, OPC. . . . Deputy Petroleum Coordinator Ralph K. Davies enlightens members of natural-gas and natural-gasoline industries on proper procedure in filing for exceptions under Conservation Order M-68. Correct procedure can expedite applications.

PRODUCTION.—Disregard of refinery requirements in setting of Texas oil allowables for August is claimed. Humble Oil & Refining Co. spokesman states reduced production may cause serious decline in manufacture of war materials. Railroad Commission calls special hearing August 7 to consider adjustments. . . . Nation's oil production declines to 3,392,000 bbl. daily. . . . Oil producers concerned over length of time present rate of production can be maintained under curtailed drilling program. . . . Arkansas Commission starts survey of Magnolia field, Columbia County, to learn extent of hydrogen sulfide damage. Operators warned of danger of blowouts from corroded well casing. . . . St. Jacob field of Madison County is fast becoming one of the active spots in the Illinois basin. Humble Oil & Refining Co. cuts crude purchases in West Texas, Southwest Texas and New Mexico fields.

REFINING.—Program for quick conversion of existing refinery equipment to increase output of petroleum war products in short time gains headway rapidly. Conversions result in important savings of critical materials. . . . Refiners asked to analyze their facilities to determine how they can mesh operations more completely into war production plan. . . . WPB approves plan of Standard Oil Co. of New Jersey and affiliated companies to increase planned production of butyl rubber by 70,000 tons. . . . Kansas refiners enter August with low inventories. Would like to run more crude to meet heavy current demand.

MARKETS.—Local shortages of crude developing in Middle West and situation continues tight. . . . Ceiling prices on gasoline, kerosene, distillates, light heating oils and residual fuels reduced in District 1 following adoption of plan for Defense Supplies Corp. to absorb abnormal costs of oil shipments to East Coast. Reaction on Gulf Coast refinery market prices not yet determined. Reductions ordered are less than total increases permitted since January 1. . . . Refinery gasolines scarce in Mid-Continent and prices rise. Gasoline sales in rationed sections running ahead of expectations. . . . Voluntary conversions of heavy-fuel oil use soar.

Refiners Shift Into High in Quick Conversion Program

By HENRY D. RALPH

The program to convert quickly existing refining equipment to the production of petroleum war products is gaining momentum and bringing an increasing number of refiners into the war effort. Although particular attention has been directed to boosting the production of butadiene, the need for increasing the output of other essential products, including toluene, benzene and isobutylene, is not being neglected. The conversion program is resulting in more savings in use of critical war materials than had been expected.

WASHINGTON, D. C.—A "quick conversion" program is now in full swing in the petroleum-refining industry, bringing more refiners into the war effort and promising to yield greatly increased quantities of petroleum war products in a short time and with the use of much less critical material than was thought possible a few months ago.

Chief attention has centered on the "quick butadiene" program because of its possibilities for permitting the production of 250,000 tons of synthetic rubber next year in addition to the output previously scheduled. For this part of the program Petroleum Coordinator Ickes said a medal should be given to Wright W. Gary, who resigned this week as director of refining of OPC, who developed and directed the conversion program. But of equal importance is the promise of early increased production of other petroleum war products, particularly toluene, benzene and isobutylene—ingredients of explosives, aviation gasoline, and synthetic rubber.

The secret of this program is conversion of existing refinery equipment to new products and processes plus better utilization of minor fractions produced by many smaller refineries. In this way it has been possible to avoid the construction of many costly new refineries complete from the ground up.

Use of 30 Nucleus Plants Involved

This program involves the use of about 30 so-called nucleus plants built around existing refineries, both large and small. Considerable equipment and some semifinished products will be moved there from other refineries, and priorities for new material will be required for an average of only about 10 per cent of the equipment needed, it is now estimated.

Mr. Gary has just returned from a series of conferences in many sections of the country and reports that the program is being pushed rapidly and that about 75 per cent of the refining industry is contributing to the program in one way or another.

These nucleus plants will buy, beg, borrow, or "lend-lease" the needed equipment from other refineries under individual agreements in each case. Other individual arrangements are being made whereby various refineries furnish heavy naphthas or other semifinished products to the nucleus plants. In still other cases arrangements are being made for certain refineries to supply, for the duration, the normal business of a nucleus plant which is being wholly converted to war products. Where financial assistance is required, the OPC will assist in securing it.

The nucleus refineries will produce butadiene from butane, heavy naphthas, and gas oil by catalytic and thermal cracking processes, and thus will not use butylene, which will be the charge stock for most of the long-range butadiene plants being constructed by Rubber Reserve Co. Such raw materials as are not produced by the nucleus plants themselves will be shipped in from many smaller refiners which heretofore have not had a part in the war program.

With modifications of their charging stocks and operating conditions, these smaller refineries can produce butylene-butadiene concentrates by thermal cracking processes, and this concentrate will then be sent to the central purification plants for separation of the butadiene. Butadiene produced this way may cost somewhat more than the estimated cost of that produced by Rubber Reserve's new butadiene plants now under construction, but will get results much more quickly. The cooperating refineries will also produce other petroleum fractions which will be turned into war products at the nucleus plants.

This development will be a boom to smaller refineries which are now piling up distress stocks of motor gasoline. By changing their processes to yield B-B concentrates they will have a product for which there is a market, but will have much less motor gasoline to dispose of and will still be able to produce the required amounts of fuel oil.

Butylene as Charging Stock

The buna-S program of Rubber Reserve originally called for production of butadiene from very large complete refineries using butane from cracking oil gas as a charging stock. For a number of reasons this was altered to use butylene as the charging stock. (See The Oil and Gas Journal, July 23, pp. 12, 13, and 14.) While this may speed up the butadiene part of the long-range program, construction of the styrene capacity and the copolymerization plants to synthesize rubber was still scheduled for completion before sufficient butadiene would be available to operate the plants at capacity.

Mr. Gary estimates that the new quick butadiene program will permit these copolymerization plants to operate at capacity as fast as they are completed. Some are already operating, and by January 1 they will be able to use the additional butadiene at the rate of 125,000 tons per year. The quick butadiene program is expected to be producing butadiene at the rate of 200,000 tons per year by next February, and by that time additional copolymerization plants are scheduled for completion so that all the quick butadiene will then be utilized. This is calculated to result in the production of some 240,000 to 250,000 tons of synthetic rubber in addition to that previously estimated for 1943.

In addition to butadiene, the refinery conversion program will result in the production of very substantial amounts of other petroleum war products, particularly toluene, benzol, isobutylene, and other products which can be made into alkylates for aviation gasoline. Increased quantities of toluene are needed for manufacture of TNT; isobutylene is required for the enlarged butyl-rubber program; and benzol is needed for aviation gasoline and for styrene, the other ingredient of buna-S rubber.

100-Octane Gasoline Output Helped

Production of 100-octane aviation gasoline will be greatly aided by the refinery conversion program, though some of the products and processes by which this will come about are so new and novel that they may not be disclosed at present. For many months details of the 100-octane program have been withheld for reasons of national security, but prior to that time it was well known that a program of constructing new large and efficient refineries had been laid out on a schedule to produce this superfighting fuel as fast as it would be needed by the president's enormous program of airplane construction. The refinery-conversion program now promises a quick augmentation of our 100-octane production this year with very little new construction. The nucleus plants and their "feeder" refineries will turn out substantial quantities of base stock, alkylates, and other secret ingredients of aviation gasoline by a variety of methods.

The conversion program also promises to forestall a threatened future shortage of benzol, large quantities of which will be needed for production of styrene as well as for other war purposes, including the manufacture of cyclohexane for the one butadiene plant being constructed to use this process. The original program was for production of styrene by chemical companies through polymerization of ethylene and benzol with an aluminum chloride catalyst. The ethylene would come from petroleum sources (natural gas or refineries), and if from refineries it would be expensive to produce and difficult to transport except by pipe line.

Under a program now being studied by the Refinery Division of OPC and by the synthetic-rubber committee of the Petroleum Industry War Council it may be found desirable to produce much of the styrene by catalytic cracking or catalytic polymerization of alcohol and benzol to produce ethyl benzene. Atlantic Refining Co. has recently announced development of a process to accomplish this, and it may also be done in Houdry process plants. Ethyl benzene is dehydrogenated to form styrene. Production of styrene by this method might cost more than under the original program, but probably could be accomplished with the use of less critical materials for the construction of new plants.

Conversion of Refineries to War Production Explained

By H. STANLEY NORMAN

This summary of refining processes for increasing production of war materials from petroleum is the result of investigations made by the manufacturing and research departments of numerous oil companies. The results have been brought together in analyses by the technical advisory subcommittee to the Petroleum Industry War Council's synthetic rubber committee and made available for general dissemination.

Chief objective is to show how existing refining facilities may be converted to the production of codimer for hydrogenation into aviation gasoline blending stock, to the manufacture of ethyl benzene from which styrene is derived for the synthetic-rubber program and to the recovery of butadiene from various feed stocks.

One outstanding point in the recommendations is the definite provision in the program for ethyl alcohol derived from fermination of agricultural products which discounts some of the uninformed charges that the petroleum industry is antagonistic to farmers and their crops.

STRONG recommendations have been made by leaders of the industry and the federal oil agencies that refiners throughout the country analyze their facilities to determine how they may mesh operations more completely into the war-production program. Extensive conversions in existing refinery facilities and techniques will result if the industry channels its operations into the production of essential aviation gasoline, butadiene, styrene and other related products.

Primary objectives are the increase of "quick" butadiene production and a rearrangement of operations in catalytic polymerization facilities permitting more advantageous utilization of acid-extraction refining units for recovery of synthetic-rubber components.

Techniques new to conventional petroleum-refining operations are the key to substantial production of butadiene without waiting for completion of plants designed especially for this purpose. Chief requirements are abnormal temperatures in cracking for maximum production of butadiene, brief contact intervals and low pressures.

Masses of data have been accumulated during recent weeks by the technical advisors to the Petroleum Industry War Council's committee on synthetic rubber. Material assembled by the technical group is becoming constantly available for general dissemination to the industry. Over 7,000 copies of reports have been issued to date.

Elevated Temperatures Desirable

Outstanding in the investigations made so far and reported by the committee are the methods of securing the elevated temperatures in existing refineries which, experiments show, are desirable for maximum yields of butadiene. At least four related approaches to the temperature problem are under investigation. They include direct injection of air into the preheated oil stream, a flue-gas heating system, a steam-regenerative method and regenerative "stoves" or furnaces.

One process consists of a series of furnaces in which carborundum baffles or other refractory material are closely spaced. Fuel is burned in a combustion chamber and the products of combustion passed through a regenerator which is filled with refractory. When the regenerator has reached the desired temperatures the products of combustion are directed to another identical regenerator and vaporized charging stock is then passed through the heated furnace. The products of the cracking reaction are passed through a steam generator from which the stream passes to a condenser and then to a compressor and other equipment as may be required for recovery of the desired products. In order to provide continuous operation, regenerative furnaces are arranged in series. One may be processing while another is being heated and the third is being made ready for putting on stream.

The Refining Division, Office of Petroleum Coordinator, has advised refiners that it considers all existing catalytic polymerization equipment should be brought into the war program for the production of essential materials. The primary need for polymerization facilities in the war-production program is in the preparation of codimer in sufficient quantity to satisfy all available hydrogenation equipment in the United States. Facilities not required to saturate the hydrogenation capacity, the OPC has suggested, should be utilized for the next most important function—that of producing ethyl benzene which can be dehydrogenated to styrene and, thereby, save large quantities of critical construction material otherwise required. Certain poly plants have already been converted to the production of cumene (isopropyl benzene).

Price of the products (codimer, ethyl benzene or diisobutylene) negotiated by OPC may include depreciation of any new capital expended at a more accelerated rate than normally would be charged against such facilities. Codimer produced by polymerization plants would be allocated at the negotiated price to refiners having hydrogenation facilities. The hydrogenated product will then be resold for inclusion in 100-octane gasoline.

In the event that diversion of nonselective polymer from motor fuel seriously affects the competitive quality of refinery gasoline, additional tetraethyl lead allocations will be granted in order to permit the manufacturer to maintain quality under prevailing conditions.

Present Feeds Satisfactory

All U.O.P. poly plants can be used for the production of codimer, operating on present feed stocks with some sacrifice in polymer yield. In this operation, the plants will be run at lower temperature than that used for motor-fuel production and will employ as much recycle as possible. Reactor type units will be run with a jacket pressure of 55 lb. Either 200 or 500-lb. chamber units will be run at 275°-300° furnace outlet temperature and with recycle sufficient to limit the temperature rise to 30°-40° F., or less.

Feed stocks consisting of either B-B or of stabilizer or absorber-stabilizer gas are suitable for the proposed operations and the change can be made without modification of present charge-collection systems. In order to produce the maximum possible amount of product of the highest octane number after hydrogenation, it is desirable to feed all available butylene to the polymerization unit. It will, therefore, be desirable to operate the cracking-plant stabilizer as a debutanizer in all cases.

The production of a codimer which will hydrogenate to a product of a high octane number is dependent on carrying out the polymerization at the lowest possible temperature. The lower limit in this regard is the temperature at which the catalyst fails mechanically, owing to ester formation or hydration. Rises in temperature, which should be held to a minimum, are controlled by recycle.

The average U.O.P. poly plant can be run at a temperature in the range of 285° to 335° F., and a recycle ratio of 1 to 1 or better. The recycle may be either B-B, stabilizer tops or liquid from reactor outlet. In one tubular-type unit, it was found that by modifying the operating conditions feeding C_4 cut, the refiner succeeded in polymerizing about 1.7 mols of normal butene per mol of isobutene without affecting the yield of codimer or total polymer and only slightly lowering the octane number of hydrocodimer.

Debutanization Recommended

Best results are obtained, it was disclosed, by maintaining a fairly high ratio of normal to isobutenes (4 to 10) in the total feed to reactors which can be secured by recycling the spent C_4 cut. Debutanization of the polymer at the plant is desirable. Rerunning of the polymer to aviation-gasoline specifications will be unnecessary because provisions have been made to make this conversion at the hydrogenation plants.

In view of the recommendation to operate the cracking-plant stabilizers as a debutanizer in order to feed maximum B-B into the polymerization unit, it will be necessary to make some provision for recovering B-B from the product to blend with this debutanized cracked gasoline for vapor pressure. In the event the poly plant is provided with a stripper, this recovery is not a problem. In cases in which no stripper is employed, it is believed that the gasolines can be adjusted to vapor pressure by recovering liquid stabilizer reflux from the poly-plant stabilizer and blending this back with the cracked gasoline.

Feed Consumption Important

In converting Kellogg-Polyco polymerization plants to production of codimer and high-octane polymer, composition of the feed has much to do with the results.

In general, there are two types of units involved. One is a complete unit including depropanization and debutanization facilities following the catalyst chambers. The other has only a depropanizer following the reactors.

In some refineries, the polymerization-unit feed can be depropanized before it is charged to the

catalytic reaction zone. In most cases, however, additional equipment would be required to depropanize the feed before it is charged to the catalyst chambers.

In nonselective plants having only a depropanizer tower, it will be practically impossible to prepare a feed containing only C_4's. Operating adjustments can be made, however, to produce polymer of satisfactory characteristics, chiefly by sacrificing yield, lowering temperatures and recycling back through the reactors as much depropanizer reflux condensate as possible.

The amount of butane that can be tolerated in the polymer will be considerably lower than normally discharged from the depropanizer tower with the product. In order to meet this limitation, bottoms' temperatures on the depropanizer tower must be raised as high as possible to permit stripping of butane.

Modification of the depropanizer-tower operation will remove considerable butane from motor fuel which is currently returned to gasoline with the polymer. As an expedient, it is believed depropanizer reflux can be used to adjust the vapor pressure of the motor fuel. The reflux will contain butane and some propane and it may be desirable to weather the condensate before it is blended with debutanized motor fuel.

Plants with facilities for preparing a B-B feed can be operated to produce high-octane number polymer by temperature adjustments and sacrifices in yield. The effluent from the reactor system will be completely debutanized so that the polymer produced will have a low vapor pressure. The butane taken overhead in this operation should be recycled to the converter system to the maximum quantity equipment will permit.

Temperatures recommended for conversion operation are considerably lower than normally used for polymerization. To activate catalyst, it will be necessary to raise the temperature, adhering to the usual time schedule, to a sufficient high degree to insure complete activation. During the activation period, when the catalyst chambers are at temperatures considerably above those proposed for best results in the aviation-gasoline program, the polymer product will be sent to regular motor fuel.

Ethyl Benzene Plan Provides Agricultural-Alcohol Outlet

THE oil industry has made a definite place in the synthetic-rubber program for ethyl alcohol produced by fermentation of agricultural products. A substantial portion of the ethyl benzene production program, terminating in conversion to styrene which is required to the extent of about 25 per cent for the manufacture of buna-S synthetic rubber, has been assigned to ethyl alcohol. The alternative of charging ethyl alcohol with benzene to catalytic alkylation plants, converted from polymerization service, is to use substantially pure ethylene.

Eight specific recommendations have been made by the ethyl benzene subcommittee of the technical advisory board. They are:

1. That ethyl benzene be manufactured using a catalytic alkylation process which employs the solid phosphoric acid type catalyst and charges ethyl alcohol and benzene as raw materials.

2. That the same process using the same catalyst be adopted charging ethylene and benzene in those locations where ethylene is presently available in a substantially pure state.

3. Excepting in those refineries where the necessary equipment and facilities already exist, no effort be made to manufacture or recover ethylene for the purpose of producing ethyl benzene.

4. Where possible, ethyl benzene be made by reacting ethyl alcohol with benzene in the presence of a catalyst of the phosphoric acid type in existing refinery units. Polymerization units are most suitable for this purpose.

5. Because there are not enough catalytic polymerization units available to produce the quantity of ethyl benzene required, refiners are asked to consider other equipment that can be adapted to manufacture of ethyl benzene by the ethyl alcohol-benzene process.

6. That any new facilities necessary be of the catalytic polymerization type using phosphoric acid type catalyst.

7. That steps be taken by the proper officials to relax the strict and complicated governmental control of the partially denatured alcohol used in the phosphoric acid process.

8. Proposals have been made by refiners for the manufacture of ethyl benzene by the Socony-Vacuum process employing Houdry type catalyst in present equipment. It is recommended that these proposals be given most careful consideration if sufficient phosphoric acid catalytic polymerization or other suitable plant capacity is not available to manufacture the required quantity of ethyl benzene.

Conclusions of the ethyl benzene subcommittee were based on the following considerations:

Recommendation 1.—It has been demonstrated that ethyl benzene can be produced from ethyl alcohol and benzene using a process which employs phosphoric acid on Kiezelguhr catalyst. This basic process has been employed extensively by the petroleum industry for a number of years for the polymerization of olefins. In this process, the ethyl alcohol is dehydrated to ethylene and the benzene is alkylated by the ethylene over the same catalyst. Further, the water liberated by the reaction maintains the degree of hydration of the catalyst necessary for satisfactory operation.

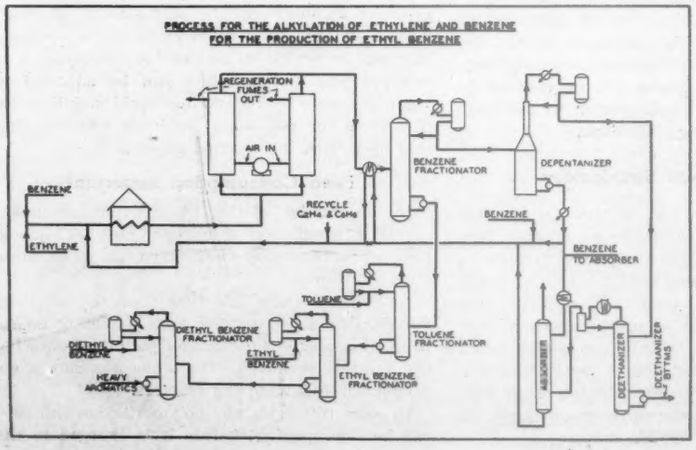
Recommendation 2.—At least two refiners have presently available substantial quantities of relatively pure ethylene. In these and other possible locations similarly situated, the same process is applicable, charging the ethylene instead of ethyl alcohol, using essentially the same operating conditions and maintaining the catalyst activity with the use of added water. Because higher production rates of ethyl benzene can be obtained from a given size plant when charging ethylene instead of ethyl alcohol it is highly desirable to make full use of all existing concentrated ethylene streams.

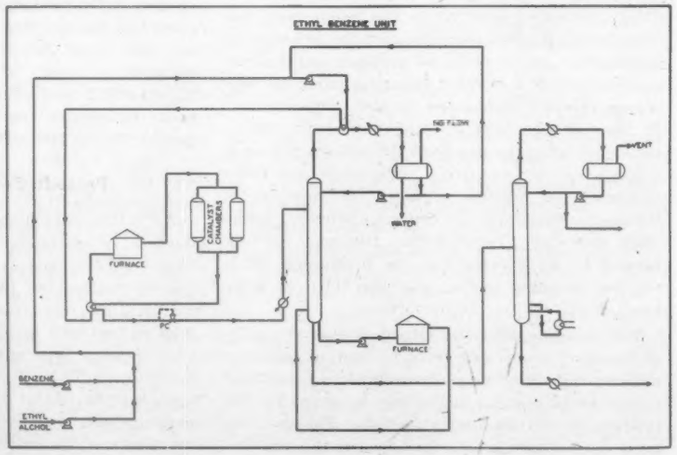
Recommendation 3.—This position was taken in view of the many difficulties involved in providing ethylene of the degree of concentration and purity preferred for this purpose. The requirements are great in fractionating as well as in refrigerating equipment .Furthermore, considerable quantities of strategic materials and pieces of equipment are required to produce ethylene suitable for making ethyl benzene in this manner.

Recommendation 4.—Units of this type have all the necessary equipment for producing ethyl benzene. They are designed to operate under the conditions of temperature and pressure necessary for this work.

Recommendation 5.—It is only necessary that such equipment have a reasonable capacity for containing solid phosphoric acid catalyst and that it can be operated at 600° F. and 250 lb. per sq. in. minimum. Considerable idle cracking equipment could be adapted to this operation with but minor modifications involving no strategic material.

Recommendation 6.—Present plans for the manufacture of ethyl benzene call for the production of ethylene by high temperature cracking in furnaces employing alloy tubes, the recovery of the ethylene by the use of large compressor capacity, refrigeration and special distillation columns and the reaction of the ethylene with benzene in special equipment using considerable quantities of aluminum chloride and dry hydrogen chloride. It is apparent that it will be much more economical of strategic metals and chemicals to employ phosphoric acid type catalytic polymerization charg-





ing alcohol where the required equipment is a low-temperature furnace employing carbon steel tubes and a catalyst chamber or chambers consisting of an ordinary steel shell. The ethyl benzene purification system will be about the same for both processes.

Recommendation 7.—Several of the refiners interested in manufacturing ethyl benzene in their phosphoric acid type catalytic polymerization plants have indicated that they consider the use of bonded tanks and pipe lines and the compliance with all the numerous regulations covering the use of partially denatured alcohol to be a serious objection to their use of the process. An investigation should be made to find whether it is possible to simplify governmental control of the alcohol to be used in the manufacture of ethyl benzene.

Recommendation 8.—The Socony-Vacuum process requires a larger quantity of benzene to make a given quantity of ethyl benzene than does the phosphoric acid type process. However, there are valuable byproducts such as toluene, which account for the additional benzene consumption. If it becomes necessary either to build new phosphoric acid catalytic polymerization equipment or to use existing equipment of the Houdry type, the decision will have to be made by considering whether metal for the new plant or additional benzene for the Socony-Vacuum process will be more difficult to obtain.

In operation, the method of ethyl benzene manufacture most favored by the technical group, preheated feed consisting of benzene, or ethyl alcohol is passed through a catalyst chamber and into a fractionating tower. The bottoms from this tower is ethyl benzene and higher boiling homologues. The overhead is benzene, ethylene and water which is condensed and passed to a combination gas-hydrocarbon-water separator. Water of reaction is removed from the system at this point. Pressure on this separator is maintained high enough to keep essentially all unreacted ethylene absorbed in the recycle benzene. Make-up benzene and alcohol are added to the recycled by the following control: (1) Fresh benzene is added to control levels in the system; (2) ethyl alcohol is added in sufficient quantity to control the mol ratio of benzene to ethylene plus ethyl alcohol at the desired level. Loss of catalyst in this operation is negligible.

Socony-Vacuum Process

Ethylene and benzene are charged continuously into a two-case catalytic converter with benzene in excess in a molar ratio of 5:1. Preliminary data indicate that each case will remain on stream for 45 minutes. At the end of the cycle, regeneration is accomplished by low-pressure air oxidation permitting the substitution of a low-pressure blower for the high-pressure turbo compressor used in conventional Houdry practice. The catalyst is a synthetic silica alumina compound. Activated clay can be used with some modification.

The primary yield of ethyl benzene may be increased in commercial operation, either by recycling diethyl benzene and running the unit slightly above optimum alkylating temperatures, or by accumulating the poly ethyl benzenes and periodically charging them together with excess benzene to the unit over the same catalyst.

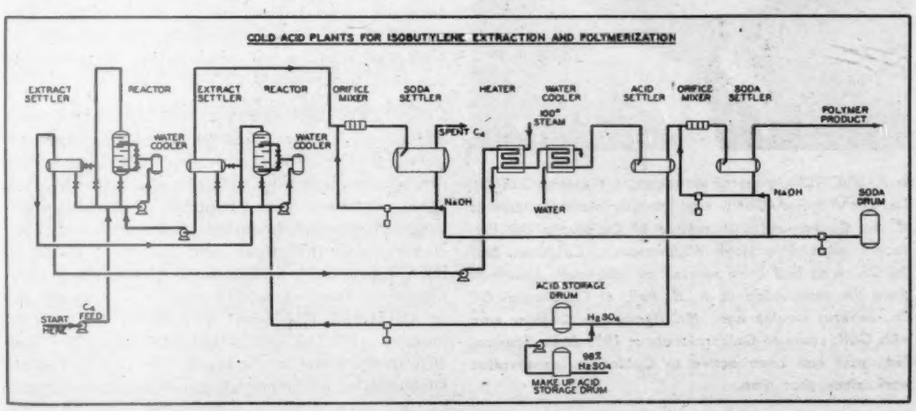
Isobutylene Recovery Urged To Increase Rubber Output

ISOBUTYLENE, urgently required to permit emergency supplies of synthetic rubber, is found in streams of butane cut from cracking operations, usually in concentrations of about 13 per cent. Feed stock for isobutylene extraction plants discussed here is a refinery B-B liquid cut with a maximum of 4 per cent propane and 4 per cent pentane and higher. Preparation of the maximum feed requires good absorption-plant facilities, a stabilizer and a tower to make a B-B cut. Refiners are urged to consider adjustments in operations to make the maximum amount of isobutylene available in feed stock. Chief objective is to convert the extracted isobutylene into a maximum yield of 8 and 12 carbon-atom polymers. This is accomplished by extracting the isobutylene with sulfuric acid and polymerizing the absorbed hydrocarbons by heating the extract.

In operation, the butane-feed cut is pumped into the suction of the recirculating pump of the second acid stage. This pump also handles extract from the acid stage, emulsion of the second acid stage and, if desired, also extract from the second acid stage. The discharge passes through a shell into the reactor using jets. The product stream from the second acid stage reactor is passed to a settling drum where the acid extract is settled from the hydrocarbons.

Acid extract from the settler is heated in a small steam-heated lead coil to polymerize the isobutylene and immediately cooled with water in a similar coil and then settled into two layers. The top layer of polymer is washed with caustic in an orifice mixing column and passed through a settling drum to storage.

The partially spent butane from the second acid-stage settler goes to the recirculating pump and first acid-stage reactor where it is contacted with fresh acid. The partially saturated extract from the first acid-stage settler mixes with the fresh butane feed at the second acid-stage reactor pump and the spent butane is washed with caustic and passed through a settling drum to storage.



Butadiene Production

HEAT of cracking, indispensable in appraisal of the butadiene process employing steam superheated in regenerative furnaces and almost equally important in other processes, was one of the first technical details receiving the committee's attention. Values of 30,000 to 35,000 B.t.u. per pound mol increase (pound mols out minus pound mols in) have been reported. The higher of the two figures has been recommended.

A detailed investigation of cracking-regenerative furnaces is under way for production of butadiene by thermal methods. The technical committee and several oil companies consider regenerative furnaces among the most promising processes on the basis of available data. Estimates have been made that a two-section furnace, each section being approximately 15 ft. long and 6 by 6 ft. in cross section, would have a capacity for charging in the order of 5,000 bbl. per day of naphtha. Other calculations consider that installation of these dimensions would handle only 1,600 bbl. per day. Complete data are necessary since it is seen that in a cracking regenerative furnace the cracking temperature is not constant. Cracking temperatures, however, involve some range of temperatures which is necessarily the case in any regenerative operation. With the determination of the effect of temperature and other variables over the necessary ranges it will be possible to select those conditions which can be used in plant operation. Selection of these conditions will determine the design of the furnace including such fundamental considerations as the ratio of refractory to void space, the length of cycle and other characteristics of the recommended design. Tests are being conducted on materials that fall in the C_4-C_5 and C_6-C_7 ranges as well as naphthas.

Use of maximum reactor pressure of 3 lb. gage for the steam-regenerative system is dictated by the necessity for a low pressure on the regenerative stoves used for superheating steam. The low pressures, characteristic of the steam-regenerative system, while favoring maximum butadiene yields, are disadvantageous from the standpoint of requiring an increased compressor load for recovery of the C_4 fraction and may require two-stage compression in order to attain the minimum desirable absorber pressures.

In one experiment, a reactor pressure of 15 lb. was used in a flue-gas heating system. There is no limitation to the reactor pressure with the flue-gas system. Substantially higher pressures may be advantageous in reducing compression and absorption costs for recovery of the C_4 fraction would be reduced and the yield of butadiene may not suffer too seriously.

Design of the combustion chamber for a flue-gas heating system was dictated largely by the Venturi nozzle selected for intimate and rapid mixing of the hydrocarbon vapor with the flue gas. The necessity for such intensive mixing as is being considered is based to some extent on assumptions which may not be confirmed.

Butadiene can be produced, the subcommittee agrees, by the steam regenerative process. The one disadvantage, however, is the large steam-generating equipment required.

Heating with oxygen-free flue gas has the important advantage that no oxygenated products should be produced since it is apparent that neither carbon dioxide nor carbon monoxide will react with hydrocarbons under the conditions used for the thermal production of butadiene.

STATE CAPITALS...

Arkansas Commission Surveying Magnolia Field To Learn Extent of Hydrogen Sulfide Damage

SEVEN engineers of the Oil and Gas Commission have been assigned to make a complete survey of individual-well conditions in the Magnolia field in Columbia County, Arkansas. The investigation, prompted by the possibility that hydrogen sulfide in the field's sour gas may have corroded through or weakened casing, probably will require most of August. Results of the survey probably will be available for a hearing on the matter in the early part of September.

All of the Magnolia field's 115 wells, each of which is located in the center of 40 surface acres, will be tested. Operators have been asked to assist the commission engineers by providing proper connection for test gages on the braden head and christmas tree of each well. If the engineers find a well that has pressure on the braden head, the source of the pressure is determined by checking the operation.

In some cases, where the sulfuric acid, a derivative of hydrogen sulfide, has corroded through the 7-in. producing string of casing, insurance against blowouts has been taken by filling the space between tubing and casing with 10-lb. mud.

Operators in the field report about 40 instances where the sour gas associated with the oil or electrolysis has corroded and eaten away the pipe and, in several cases, caused near blowouts.

Magnolia Field Reserves

The Magnolia field underground reserves are estimated at 160,000,000 bbl. of crude underlying 200,000,000,000 cu. ft. of hydrogen sulfide bearing gas. The reservoir pressure is more than 3,000 lb. per square inch after 4 years of continuous production.

The Magnolia field is now producing an allowable of approximately 18,000 bbl. of oil daily, together with 16,000,000 cu. ft. of sour gas. All gas produced in the field is processed for its natural-gasoline content in the Shell Oil Co., Inc., plant. Daily recovery consists of about 60,000 gal. of natural gasoline and butane.

Residue gas from Shell's plant is desulfurized by Lion Oil Refining Co. at a purification installation near the center of the field. Gas enters the Lion plant containing 1,800 grains of hydrogen sulfide per 100 cu. ft. and leaves the process with less than 1 grain per 100 cu. ft. The hydrogen sulfide removed is converted into commercial sulfur by the Southern Acid & Sulphur Co., of Little Rock, Ark., and Memphis, Tenn. Part of the sweetened gas, after leaving the Lion plant, is used in repressuring the Schuler field and the remainder is consumed at refineries and at producing operations in the various stripper fields in southern Arkansas.

A majority of the 115 wells in the Magnolia field are completed by setting 10-in. pipe around 2,000 ft. and then drilling to 7,500 ft. where 7-in. is cemented.

In loading wells with mud in instances where pressure irregularities indicate casing trouble, a packer is set on the 2-in. tubing at about 7,000 ft. The 10-lb. mud is then pumped into the annular space between tubing and the 7-in. casing, effectively controlling the gas pressure which has threatened to crater the hole.

TEXAS

REDUCTIONS in production which have been made in the East Texas field since March have been an important factor in stabilization of reservoir pressures. Average bottom-hole pressure in 99 key wells July 1 was 1,038 lb., which was approximately the same as on June 1, and about 30 lb. above the record low reached March 1. Daily oil output of the field is about 60,000 bbl. below the average for last autumn and early winter when bottom-hole pressure began to slip at an alarming rate. At that time, for relief of the situation, the Railroad Commission put into effect a program to compensate operators for injecting salt water. Also several other measures to conserve gas pressure subsequently were enacted but none has proved so effective as the cut-back in production.

ALLOWABLE PRODUCTION of sour gas in the Texas Panhandle district was fixed at 670,226,000 cu. ft. daily during August by a Railroad Commission order issued late last week.

DELETION OF THE PROVISION calling for individual reporting on the production of condensate wells was ordered last week in Railroad Commission Form 3-226-A. The amended form deletes the following instructions: "Gas wells producing condensate or crude oil must be reported separately and runs from each well shown."

CONSERVATION CHAIRMAN . . .

R. P. HUGGINS, general manager of Western Gulf Oil Co., Los Angeles, Calif., was recently elected chairman of the Conservation Committee of California Oil Producers, succeeding Lloyd Williamson, of California Star Oil Co., who had been serving as temporary chairman since the resignation of A. H. Bell, of Continental Oil Co., several months ago. Mr. Huggins, a 20-year man with Gulf, came to California about 1938 from Houston, Tex., and has been active in California conservation work since that time.

KANSAS

DAILY ALLOWABLE oil production for Kansas during August has been set by the Corporation Commission at 281,900 bbl., a decrease of 1,300 bbl. from the daily allowable for July. Nominations for 318,038 bbl. had been made by purchasers. Of the August allowable, 56,062 bbl. has been allocated to unprorated pools and 5,000 bbl. for condensate and natural gasoline.

OKLAHOMA

THE AUGUST daily oil allowable for Oklahoma has been set by the Corporation Commission at 415,500 bbl. This is a decrease of 17,500 bbl. from the July figure. The allowable includes 386,500 bbl. for crude oil and 29,000 bbl. for natural gasoline. Increased allowables were granted four pools. These pools and the amount of their increases are: Brooksville, 320 bbl.; West Hotulke, 200 bbl.; Pauls Valley, 1,000 bbl., and East Watchorn, 600 bbl. Pools in which cuts were ordered and the amount of the cuts are: Billings-Wilcox, 400 bbl.; Avoca, 150 bbl.; Cement, 1,000 bbl.; Coyle, 700 bbl.; East Cromwell, 1,000 bbl.; Hotulke, 500 bbl.; South Konawa, 150 bbl.; South Maud, 100 bbl., and Tecumseh Lake, 100 bbl. Allowable for the new Liberty pool, Noble County, has been set at 600 bbl.

CALIFORNIA

THE HEAVY CRUDE-OIL SURVEY under way in California has reached the point where practically all phases of the situation except the final cost analyses have been completed. The large inventories of some California operators are receiving careful attention and it is generally expected that some method will be devised whereby surplus stocks will be made available to some operators who do not have adequate casing and other drilling and production equipment. Some of the major companies are now becoming interested in good used casing. Some of the large operators are already swapping casing and exchanging supplies in order to put all casing to the best use possible.

THE CONSERVATION COMMITTEE this week addressed a communication to all producers requesting that all avoidable venting of gas to the air, even though very small, be eliminated at once. L. A. Cranson, vice president of Honolulu Oil Corp., has been appointed chairman of the gas committee to investigate and take such action as may be necessary to reduce gas waste. The critical nature of the prospective supply of natural gas in California has been of concern for several months with the result that OPC has given specific instructions to the Production Committee for District 5 to eliminate all gas waste immediately.

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PRODUCING REFINING NATURAL GASOLINE PIPE LINE

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Protect Progress

Representatives of the Department of Justice and others at Washington are again pressing their plans to bring about a basic change in the nation's patent laws. These proponents apparently feel that while a people are confounded by many things, the time is opportune to extend their theories of government and economics to include direct control of patent procedure.

The methods being used are characteristic of those in authority who are constantly demonstrating that they are not in sympathy with the American plan of industrial progress whose accomplishments are the outstanding development of this emergency period. The significance of minor happenings is exaggerated, the exception is made to appear the rule, outside issues are brought in, and finally there is the current charge that the war effort has been hamstrung and delayed.

The suggested remedy is to place everything under the control of the justice department which, it is claimed, will retain whatever virtues the present patent system has and eliminate the imperfections—another major step in the centralization of economic power in governmental administration.

The main trouble in this situation, as in many others, is that extraneous matters have been made part of the record. Our patent objective, as laid down in the Constitution, is to give Congress "power to promote the progress in science and useful arts by securing for limited times to authors and inventors, the exclusive rights to their respective writings and discoveries."

There is nothing involved about that nor need there be any confusion relative to patent legislation that was enacted to carry out the constitutional provision. There are plenty of antitrust and other laws to take care of any abuses in business practices involving the use of patented processes and devices. It is not the fault of a sound foundation if a faulty building is erected on it.

The strongest proponents of our patent system do not claim perfection. Revisions in administration to meet changed conditions are needed.

But no fundamental changes are wanted by those who are familiar with the part that patent protection has played in the development of this country over the past 150 years. It has been and is an essential part of an economy which has given this nation its industrial leadership and its citizens the highest standard of living.

The oil business furnishes as good an example as any of what the incentive of patent safeguards have meant in individual achievement and in industrial advancement for the common good. Few oil processes and operations have been the invention of a single mind. Pooling has been necessary in order that the industry could have the maximum advantage quickly of numerous discoveries. Present practices in the producing, refining and transportation arts would never have been achieved under any other program.

The Government's own records in regard to oil furnish the answer to the charge that patent protection has been used by monopolists to maintain high prices and otherwise gouge the consumer. The steady decline in petroleum prices with improved quality started with the application of practical inventions in petroleum operations. This industry was prepared when this emergency arrived, and numerous war problems are being solved, because of the encouragement that management has always given to inventions protected by patent laws.

Here is another case where performance of the past is much more convincing than the promises of radical change. Oil operators must do their part in seeing that Congress clearly understands the issues and that it does not, under pressure from enemies of free enterprise, enact legislation which would seriously cripple the war and postwar plans of 130 million people.

Industry Marks Time as WPB Considers Priority Changes

By HENRY D. RALPH

WASHINGTON, D. C.—A new preference-rating order for the oil industry to replace P-98 which expired August 1 had still not been issued by late Tuesday, though indications were that OPC and WPB drafting officials had virtually reached agreement on all points and that the order would be issued in a day or two.

As nearly as can be learned, the new order will be a considerable modification of P-98 and the changes are so great that it may be decided to give it a different number instead of calling it an amendment to P-98. It is understood that the new order will radically reduce the amount of critical materials used by all branches of the oil industry and very probably will permit their use only for maintenance, repair and operating supplies. If this is done it would mean that any new construction or drilling would require an individual project rating.

The new order probably will run through September pending a decision on whether to put the oil industry under some sort of allocation system during the fourth quarter.

The PRP plan was opposed by the oil industry and by many officials in OPC because of the great amount of paper work required in making quarterly estimates of materials to be used, and because of the fear that WPB would use the plan to reduce the amounts of steel allocated to oil.

The fact is that WPB has not abandoned its intention of putting the oil industry under a modified PRP, but has simply agreed to postpone action until a further study can be made of the industry's uses, inventories, and requirements of critical materials.

This study is being made in the form of a questionnaire already sent to a couple of hundred representative firms in all branches of the industry in order to provide a spot check from which the condition of the entire industry can be estimated. The information called for in this questionnaire is basically similar to that called for in Form PD-25A, the quarterly application used by companies under PRP. Those receiving the questionnaire are urged by OPC to make returns promptly and completely.

It is possible that as a result of this study the original intentions of WPB will be greatly modified and the industry will not be required to make advance estimates of its requirements of all critical materials in as great detail required by PRP. Many officials in OPC, however, are advising their friends in the oil business to be prepared to give all information required by the recently revised PD-25A just in case WPB decides to demand it.

Survey of Materials

A survey of the anticipated requirements of critical materials that will be used by the petroleum industry during the last quarter of 1942 was begun this week by Petroleum Coordinator Harold L. Ickes.

The information, which will be submitted to the requirements committee of the War Production Board by August 15, will cover the five branches of the petroleum industry—production, refining, transportation, marketing, and natural gas and natural gasoline. The survey will cover the petroleum industry's use of the critical materials listed in WPB's Materials List 1, revised. Included will be maintenance, repair, and operating supplies, and, separately, new construction requirements.

Three factors will be determined by the survey: (1) The quantity of critical materials used by the oil industry during the April-June 1942 quarter; (2) the inventory position on June 30, 1942; and (3) the anticipated requirements of critical materials during fourth quarter of 1942.

Operators Oppose Some Parts Of New Materials Plan

EXTENSION of P-98 last week allowed oil companies to continue using the old channels in attempting to obtain material with which to carry on the curtailed drilling program until the industry, OPC and WPB can work out a feasible supply plan. Principal efforts continued to be directed toward adapting the Production Requirements Plan to the petroleum industry.

A meeting between William F. Huff, assistant deputy coordinator for OPC, and oil operators of the Gulf Coast area at Houston Monday brought out the general plan and some of the industry's reaction to it. This meeting followed similar ones held in the East, Kansas and California and was followed by one in Tulsa on Wednesday morning.

Briefly, the plan being discussed would call for operation on a projects-rating basis and an inventory including all equipment used in each branch of the industry (production, marketing, refining, transportation, natural gas and gasoline) by districts. Repair parts and items having a replacement value of less than $10 would be excluded from the detailed inventory but would have to be included in the totals. Descriptions of the material would be the same as the specifications used on the purchase order for such material.

After determining the inventory position, the oil companies under the plan being discussed would be required to report the total on hand and the overage and underage to OPC district offices where a card or ledger index will be maintained. The inventory includes 104 headings under which approximately 2,500 items would be listed.

Copies of the overage and underage statement will be available to oil and supply companies and any qualified supply company may purchase from an oil operator (for cash or on agreeable credit terms) materials or equipment either to supply another oil company having an insufficient inventory or to replenish its own stock so it is at the minimum working level. For handling the transaction, the supply company gets 5 per cent of prevailing price which includes the delivered cost plus loading, unloading and storage charges.

Objections to Plan

Objections to the plan on the part of oil companies and supplies include the amount of work connected with making the original inventory and in keeping it up to date. It is contended that the inventory would be out of date before it could possibly be put to use.

Another objection is that it would be unnecessary and a duplication of effort under a Production Requirements Plan which requires that the request for a project rating show the inventory of material on hand. If such an inventory is necessary under whatever plan is worked out, most operators feel that it should be greatly simplified and should include only the major items involving critical material which are actually surplus and which are not intended for maintenance or operating use.

Most oil operators feel that during the next 6 months the bulk of the equipment now in existence will be worked off and a more feasible plan would be one whereby certificates for new projects issued by OPC will be given to oil companies which would in turn give them to the supply companies for the obtaining of basic materials.

The definition of excess inventory is not clear at this time. Many believe that it should include that material on hand above the current quarter's needs for actual operation and maintenance, and repair, with the items requiring more than 90 days for delivery being deducted from the total stocks.

Plans Formulated for Materials Inventory in District 3

HOUSTON, Tex.—A materials meeting in District 3 was held at Houston Monday in which plans for a survey of all inventories among oil and supply companies would be made. The meeting was addressed by W. F. Huff, assistant deputy coordinator for the OPC at Washington. Mr. Huff pointed out that such a survey was needed so that vital operations of the industry could be carried on without drawing too heavily from raw materials so badly needed for the war effort.

Present plans call for the setting up of a centralized office whereby inventories of the companies could be made public and these could be drawn upon as needed without the present delay of locating vital materials. Details as to how the national survey will be made will be announced by OPC after it has studied recommendations to be made by subcommittees in the various districts which are now working on the problem.

WPB Ties Up Wire Rope Stocks

The War Production Board, effective August 1, forbade the sale of wire rope of all sizes from warehouses and retail stores except on an A-1-A rating. The prohibition on sale of wire rope was contained in Amendment 6 to M-21-B. At the present time WPB is reported to be considering excepting wire rope for oil-field use from the amendment.

Under present conditions governed by M-68 and P-98, oil-field users can use an A-8 rating for obtaining supplies. Through the use of application form PD-1A it would be possible to receive a better rating for a specific project. At present, supply companies are permitted to sell 3 per cent of the quota in the comparable quarter year to meet emergency needs of users.

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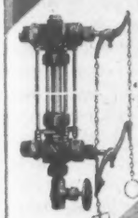
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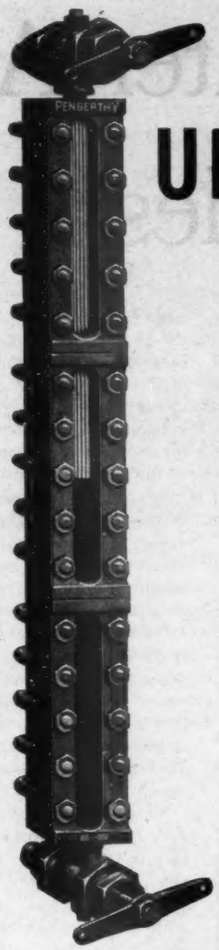

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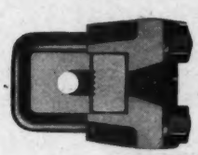

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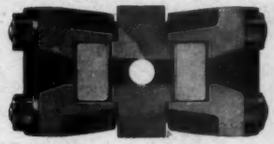

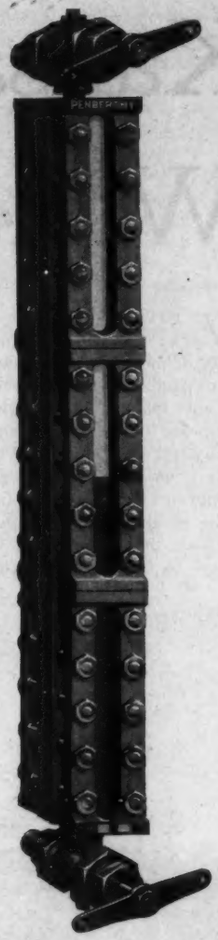

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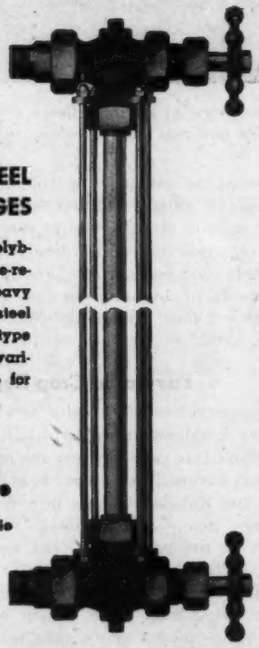

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Kansas Refiners Enter August With Low Inventories

By W. T. ZIEGENHAIN

WICHITA, Kans.—Every one of the 20 refineries operating in Kansas has reported directly or indirectly that it would like to run more oil in August to better meet the unusually heavy current demand for refined products. Tank trucks are daily calling at these plants for heavier loads and more regularly than a year ago and there is also a consistent demand for products to be moved by rail and gasoline pipe lines.

The result of these heavy drafts upon Kansas has been the reduction of refined-oil inventories almost to the bare operating margin. This has occurred in advance of the heavy consuming months of August and September and one refiner said in this respect, "I do not know what we will do when the refill orders come in for furnace oil this fall because we are out now and the prospects of building up our furnace-oil inventories are poor and the prospects of our getting more crude to run are equally poor."

Typical view of Kansas refinery showing pile of scrap rubber in foreground, a sign, "Production Wins" in background and tank trucks waiting to handle an unexpectedly large and insistent farmer demand for petroleum

Favorable Crop Reports

Kansas refiners normally serve a good portion of the middle-western farm belt including Colorado and this year farmers are reporting unusually heavy crops in all areas. It is only natural then that the Kansas refiners now have and also anticipate heavy fall business. When commenting upon the prospects of late fall demand one refiner said, "This is the first time I have seen the farmers in my territory reporting both a bumper crop and a high price." Then he continued, "If the trend toward using gasoline in tractors continues we will be selling nothing but 70-octane material to those people a year from now."

Another important factor tending to boost refinery sales this year in Kansas has been the shipment of more gas oil and residuum fuel oils from Kansas to the industrial centers of the East.

The increased fuel demand had been partially anticipated and was prepared for by refiners generally cutting their gasoline yields 20 per cent. The fuel production was thereby increased by approximately this quantity. However, most Kansas refineries were balanced for cracking the normal yield of gas oil and topping crude and it was not uniformly economical to simply curtail gasoline production 20 per cent and dump an equivalent quantity of gas oil into the corresponding heavy-fuel production. So, the net effect of this order was to reduce crude runs as well as to curtail gasoline production. It is this effect that is proving disadvantageous now.

A list of Kansas refineries now operating and the location of these plants together with their daily crude capacities appear below:

Company and location of refinery—	Daily crude capacity (bbl.)
Anco Refining Co., Inc., Garnett	750
Bareco Oil Co., Wichita	6,000
Bay Petroleum Corp., McPherson	5,000
Cooperative Refining Association, Phillipsburg	3,500
Derby Oil Co., Wichita	8,000
El Dorado Refining Co., El Dorado	8,500
Falcon Refining Co., Great Bend	2,000
Globe Oil & Refining Co., McPherson	15,000
H. & T. Refining Co., Chase	2,000
Kanotex Refining Co., Arkansas City	9,000
National Refining Co., Coffeyville	9,500
Phillips Petroleum Corp., Kansas City	23,000
Plains Oil & Refining Co., Great Bend	2,500
Shallow Water Refining Co., Shallow Water	2,000
Sinclair Refining Co., Coffeyville	11,000
Sinclair Refining Co., Kansas City	10,000
Skelly Oil Co., El Dorado	25,000
Socony-Vacuum Oil Co., Augusta	22,500
Standard Oil Co. (Indiana), Neodesha	7,700
Vickers Petroleum Corp., Potwin	4,500
Total	177,450

Kansas refiners normally compete very strongly for farm business that exists in the north-central quarter of the country and they have progressively extended their transportation services in that direction.

One of the most important means Kansas refiners have found for serving and expanding this farm market has been the laying of product lines from their Mid-Continent plants to supply depots at important distribution points well within the farm area.

For example, the first major pipe-line system to take Kansas gasoline north was the Phillips Petroleum Co. line, laid in 1930 and which took products from the company's Kansas City, Kans., refinery to East St. Louis where they were loaded on river barges for distribution in the upper Mississippi Valley. At about the same time the Great Lakes Pipe Line System started to take substantial volumes of refined products from other Kansas refineries into the very heart of the corn belt and well into the Minneapolis and Chicago trade territories. While feeling the pinch of these pipe lines, several years ago Kansas refiners saw an Oklahoma refiner lay a "loading rack" line all the way across Kansas from north to south from the Champlin refinery at Enid, Okla., to a point just over the Kansas line in Nebraska. Later this line was extended northward into Iowa. History records also the laying of an important pipe-line system from the Sugar Creek, Mo., refinery of the Standard Oil Co. (Indiana) to Council Bluffs, Iowa, and this, of course, brought the largest gasoline marketer in the farm territory directly into the gasoline pipe-line delivery business.

Now, engineers are reported to be making surveys from the southeastern Kansas refining territory to Clay Center, Neb., a distance of about 120 miles. Ohio Oil Co. is undertaking this survey although this company is not directly identified with the operation of any refinery in the Kansas group. Whether this line will be built must await future announcement but its serious study further indicates the trend of thought and helps to confirm the faith in the future maintenance of a high rate of Kansas refinery operations so long as crude is made available.

Production of War Materials

Because the majority of Kansas refiners are relatively small, they early found it difficult to enter fully into the Government's war-production program. They were likely candidates for pooling certain gasoline fractions from which aviation fuels could be made in a central plant but the plans were turned down, one by one, in the interest of conserving materials and concentrating the production of aviation fuels in existing large refineries.

Then the rubber program presented itself to refiners and the smaller plants were asked what they might contribute to the synthetic-rubber production program. At first this looked like another aviation-gasoline problem to be solved solely among the major refineries. Then, however, the urgencies of war, the shortage of metal for construction uses and the desire to put these small plants to more direct war use, prompted the pooling of research results on the subject in the Washington offices of the director of refining in OPC.

As a result of this, Kansas refiners are pondering over plans to make cumene, codimer, ethyl benzene, and diisobutylene. These materials are quite foreign to Kansas refining operations but each has a place in the war-production plan. Furthermore, each can be made according to known and practiced procedure in relatively small refineries and in equipment that can be salvaged from many abandoned refining installations.

Just how to transform any existing obsolete

equipment to produce one of these products remains an engineering problem to be solved by the company and OPC office but the practicability of the program is accepted. Probably the most interesting development is the prospect of the small-scale production of butadiene, the basic material for buna-S, the most sought rubber substitute to replace natural rubber for tires.

Four general plans have been enumerated by the refiners technical committee which is advising the OPC. These are mentioned with greater detail in the general survey of refinery conversion problems prepared by H. Stanley Norman and appearing in this issue starting on Page 13.

The Kansas refiners have studied each procedure and a committee of technically minded refinery executives under the chairmanship of F. W. McCurry, vice president and general manager of Derby Oil Co., has explored every phase of the problem from a cooperative standpoint and there remains little doubt but that Kansas refiners will readily be assembled in an orderly program to most effectively produce butadiene and other war materials to the greatest advantage.

So far, the preliminary conclusions of individuals who have studied the application of the general program to the facilities of the Kansas refiners seem to agree that shortages of steam-generating capacity and water-cooling capacity will limit the all-out participation of Kansas plants in the plan, especially if plant construction must be limited to equipment readily available. Another important item which is recognized as scarce in all refining areas is gas compressors.

Heat-resisting steel alloys needed to withstand processing temperatures up to 1,800° F., in one instance, also are important. To overcome this, Kansas refiners have been told they might line vertical chambers with fire brick or some other refractive material and while cooling the outside of the chamber with steam, may heat a stream of butane in direct contact with superheated steam or flue gases to 1,400° F. or higher and thereby dehydrogenate a substantial portion of the base stock to make butadiene. Other methods mentioned include heating a checker brickwork inside a chamber to a temperature well above 1,400° F. by means of direct combustion or through the passage of superheated gases through the chamber and then halting the heating procedure long enough to force the passage of hot butane and butene through the chamber where the checkerwork will give up a part of its heat to the hydrocarbon vapors and thereby cause the removal of a part of the hydrogen from the butane to make butadiene.

Still another and very promising method calls for introducing a limited quantity of air along with the butane into a tube and burning as much butane as fuel as is chemically practicable in view of the predetermined quantity of air present. This practice is not new to the chemical field but it obviously calls for precision and thorough engineering. The latter process involves a greater degree of purification of the products because the butadiene resulting is contaminated with the unconverted hydrocarbons and the products of combustion.

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Weakness of Early Rationing Plans Shown in May Figures

By J. P. O'DONNELL

NEW YORK.—The comparative ineffectiveness of the original gasoline-rationing plan is apparent from reports of state gasoline consumption for the month of May. Up to May 15, the 17 East Coast states and the District of Columbia were under 33⅓ per cent curtailment and from that date on a temporary rationing plan was in effect in all these states except for a western area consisting of 93 counties. The temporary rationing plan was designed to effect a saving of 50 per cent.

Data compiled by the statistical department of the American Petroleum Institute from state reports shows that May 1942 gasoline consumption in these states was 657,486,000 gal. against 855,323,000 gal. in the same month of 1941. This was a reduction for the entire ration area of 23.1 per cent, which was considerably short of the intended goal of a one-third reduction in the first half of the month and a one-half reduction in the second half.

Consumption in the rest of the country, excepting the states of Colorado and Michigan for which data were unobtainable, declined 7.7 per cent. If this figure is applied to the May 1941 consumption of the East Coast region, it would indicate that the reduction in that area attributable solely to rationing amounted to only 15.4 per cent. The 7.7 per cent reduction resulted from the more conservative use of cars by motorists who were conserving their tires.

The accompanying table compares the May 1942 consumption of states in the rationed area with that of May 1941. It shows that the New England states were hardest hit. Consumption in that area was off 28.1 per cent against 23.7 per cent for the Middle Atlantic area and 18.0 per cent for the South Atlantic states. New Hampshire, down 31.0 per cent, registered the largest decline, while Massachusetts, which normally accounts for approximately half of the New England consumption, declined 30.2 per cent. Declines were less in the partially unrationed Middle Atlantic states and even less in the South Atlantic region, which is most accessible to Gulf Coast refining district.

The total reduction in gasoline consumption for the rationed area from May 1941 to May 1942 was 197,827,000 gal. This was equivalent to 4,700,000 bbl., or less than 4 days' demand for all oil products for the East Coast district. This would be approximately 12 per cent of the May demand for the East Coast, a reduction that was wholly insufficient in view of the greatly curtailed transportation facilities.

All states except four, Mississippi, Nevada, Texas and Washington, consumed less gasoline in May this year than in the same month a year ago. Of the four, only Texas, up slightly more than 6 per cent, showed an appreciable increase. For the first 5 months of 1942, indicated nation-wide consumption was but 3.7 per cent less than last year. This figure will be greater later in the year since some of the states, notably California, were still running ahead of 1941 despite their declines in May. California consumption for the first 5 months was up approximately 10 per cent. Texas consumption was running more than 12 per cent greater than last year at the end of the first 5 months.

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August Motor-Fuel Demand Estimated 53,800,000 Bbl.

WASHINGTON, D. C.—Market demand for motor fuel during August is estimated at 53,800,000 bbl. in the monthly forecast of the Bureau of Mines. This is 700,000 bbl. greater than the forecast for July but 18 per cent less than the actual demand in August 1941.

Production of straightrun and cracked gasoline for the month is estimated at 42,920,000 bbl. With 3,980,000 bbl. of natural gasoline to be used at refineries, total refinery production of motor fuel is placed at 46,900,000 bbl. Direct sales of natural gasoline are forecast at 1,400,000 bbl., and it is estimated that 5,500,000 bbl. will be withdrawn from storage.

EAST COAST GASOLINE CONSUMPTION

State—	May 1942	May 1941	Change Gallons	Change Per cent
New England:				
Maine	11,552,000	15,528,000	3,976,000	25.6
New Hampshire	6,024,000	8,741,000	2,717,000	31.0
Vermont	4,753,000	6,719,000	1,966,000	29.2
Massachusetts	49,929,000	71,574,000	21,645,000	30.2
Rhode Island	9,303,000	12,971,000	3,668,000	28.3
Connecticut	29,004,000	38,235,000	9,231,000	24.1
	110,565,000	153,768,000	43,203,000	28.1
Middle Atlantic:				
New York	139,562,000	190,885,000	51,323,000	26.8
Pennsylvania	122,253,000	154,793,000	32,540,000	21.2
New Jersey	68,330,000	89,964,000	21,634,000	24.0
Delaware	5,046,000	6,267,000	1,221,000	19.5
Maryland	26,172,000	32,646,000	6,474,000	19.8
District of Columbia	13,381,000	16,874,000	3,493,000	20.7
	374,744,000	491,429,000	116,685,000	23.7
South Atlantic:				
Virginia	34,282,000	43,766,000	9,484,000	21.7
West Virginia	17,023,000	20,241,000	3,218,000	15.9
North Carolina	36,258,000	45,348,000	9,090,000	20.0
South Carolina	18,360,000	23,483,000	5,123,000	21.8
Georgia	30,065,000	38,370,000	8,305,000	21.6
Florida	36,199,000	38,918,000	2,719,000	7.0
	172,187,000	210,126,000	37,939,000	18.0
East Coast	657,496,000	855,323,000	197,827,000	23.1
United States*	1,970,316,000	2,278,593,000	308,277,000	13.5

*Except Colorado and Michigan, unavailable.

Humble Seeks Change in Texas Allowable to Spur War Output

HOUSTON, Tex. — Disregard of refinery requirements in the August proration allowables in Texas fields as expressed in purchaser nominations threatens to cause a serious decline in the manufacture of materials necessary for the war program. The wide disparity between allowable schedules in certain fields and the crude requirements of at least one of the large Gulf Coast refiners has resulted in a Railroad Commission call for a special hearing August 7 at Austin, Tex. Broad invocation of purchaser proration is probable unless adjustments are made by the commission.

John R. Suman, vice president of Humble Oil & Refining Co., advised the Railroad Commission last week that the company's refineries would fall 3,500 bbl. below the daily schedule of 91-octane gasoline production unless allowables are revised to provide the necessary types of crude in the required volume.

"We have just completed an analysis," Mr. Suman wrote, "of the effect the commission's August proration order will have upon Humble's supply of oil and its ability to produce essential war products and deem it necessary to lay the matter before you at this, our earliest opportunity.

"Humble is attempting to operate its refineries in such manner as to produce the maximum amount of war products with the minimum crude runs, in line with schedules prescribed by the Office of Petroleum Coordinator for War. It carefully prepared its August nominations for oil from various fields and districts in Texas with the object in mind of being able to operate its refineries on the program stated, and to supply its customers with crude oil with which to operate their refineries for the same purpose. Therefore, our August nominations represent our real demand for oil from various fields as nearly as it is possible for us to foresee.

"The commission's August order leaves the company sadly deficient in oil essential to the manufacture of war products and seriously over supplied with oil, such as high-gravity low-octane oil produced in Southwest Texas and in West Texas, useful principally for the production of motor gasoline for which demand has declined rapidly."

Humble Reduces Purchases in Texas and New Mexico Fields

HOUSTON, Tex., Aug. 4. — Effective 7 a.m. August 1, the Humble Oil & Refining Co. reduced its purchases in West Texas, Southwest Texas and New Mexico fields. The company will purchase 55 per cent of Pearsall crude and all fields from which it purchases in West Texas except Yates and World fields. Eighty per cent of the allowable production in 20 fields in Southwest Texas producing low-octane crude will be purchased. Eighty-five per cent of the allowable production in 18 fields in Southwest Texas producing Mirando heavy and Refugio heavy-type crude will be purchased.

New Mexico purchases will be limited to 55 per cent of the July allowable except it will take the August allowable from properties to which the company is connected in the Cooper and Lynn fields.

The continued shortage of tankers, limited storage facilities and the necessity of utilizing those grades of crude oil required to manufacture essential war products are the reasons for the reduction.

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Levy Expected to Produce 5,000 Tank Cars for Eastern Service

WASHINGTON, D. C.—By telegram Monday to oil and tank-car companies, Ralph K. Davies, deputy coordinator of OPC, imposed a levy of 12½ per cent of all tank cars now in service east of the Rockies, in addition to those now in East Coast service, for immediate assignment empty or loaded for East Coast movement. This is expected to produce 5,000 additional cars which railroads now can handle because of ODT arrangement for through-train movements. Where this leaves some areas without sufficient tank-car transportation limitation orders will be imposed to curtail consumption.

Mr. Davies also instructed all East Coast marketers to increase their rail movements from Districts 2 and 3, pointing out that the DSC subsidy now covers increased purchase price in District 2 as well as transportation costs.

Arrangements with OPA are expected to be completed soon to permit readjustment of costs of products due to shifts in refinery yields to produce more fuel oil.

Price Adjustment Authorized On Hudson, Wyoming, Crude

WASHINGTON, D. C.—The maximum price for crude oil produced in the Derby and Dallas pools and the Hudson Oil Co.'s production from the Hudson pool near Lander, Wyo., has been established at 60 cents per barrel, delivered at Lander, Wyo., the Office of Price Administration announced last week.

The revised ceiling prices for these crudes, which were sold under long-term contract to the Standard Oil Co. of Indiana, was contained in Amendment 24 to Revised Price Schedule 88.

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British American Names Two Additions to Executive Staff

THE British American Oil Producing Co. this week announced two additions to the executive staff. In addition to these new appointments, H. C. Arnold, executive officer, has effected a reorganization of the operating personnel which results in the promotion and transfer of several of the head office staff.

The new executives already appointed are C. D. Miller, as vice president in charge of drilling and producing operations, and W. K. Esgen, as manager of the Gulf Coast division.

C. D. Miller, formerly general superintendent of the Barnsdall Oil Co., is well known to Mid-Continent operating men. He has been active in development and production work since 1927. In addition to his interest in field operations, Mr. Miller has been active in A.P.I. work, serving as chairman of the various committees.

W. K. Esgen was in the geological department of Humble Oil & Refining Co. until he resigned to organize the Trinity Petroleum Co., of which he was vice president and treasurer.

H. A. Eklund, formerly in charge of the British American land department, Gulf Coast division, has been promoted to manager of the land department at Tulsa.

F. M. Oglesby, for the last 3 years in Tulsa land department, has been made manager of British American's northern division, comprising Kansas, Wyoming, Montana, and the Dakotas.

H. A. Thompson, who has been in charge of the Oklahoma City office, has been made district land man with headquarters in Casper, Wyo.

Robert Kepke, formerly in charge of the company's legal work in the Texas division, has been transferred from Houston to Tulsa as executive assistant to Mr. Arnold.

The British American Oil Producing Co., under Mr. Arnold's direction, has undertaken an expanded exploration program in 1942.

C. D. MILLER *W. K. ESGEN* *F. M. OGLESBY*

Petroleum Board Is Created Jointly by Army and Navy

WASHINGTON, D. C.—Creation of an Army-Navy Petroleum Board has been announced jointly by the U. S. Navy and War departments. The new board is charged with the tasks of determining overseas oil needs of the Navy and Army wherever they may be, insuring the procurement of the needed oil, loading ships to deliver it, its transportation to overseas areas, and its safe storage at points of destination.

The board is composed of three representatives from each service who will be responsible for close cooperation between the two departments on all matters pertaining to petroleum. The board also is responsible for the preparation of full information on all phases of petroleum products with which the Navy and War Departments are concerned. Composing the board are Brig. Gen. Walter B. Pyron, War Department petroleum liaison officer, representing the War Department; Capt. A. F. Carter, U.S.N.R., Navy Department petroleum liaison officer, representing the Navy Department; Brig. Gen. T. J. Hanley, Jr., representing the Army Air Force; Capt. R. L. Mabon, U. S. Navy, representing the Bureau of Supplies and Accounts of the Navy Department; Brig. Gen. C. P. Gross, representing the Army Transportation Service, and Capt. E. J. Foy, U. S. Navy, representing the Naval Transportation Service.

In each overseas military area one officer of the Army or Navy is to be designated as Area Petroleum Officer by the U. S. Army or Naval officer exercising unity of command in the area.

The Army-Navy Petroleum Board is primarily concerned with overseas shipments of oil. Thus, it is charged with the additional duty of maintaining close liaison with the Office of the Petroleum Coordinator for War, which has the responsibility for oil production, refining, and transportation within the United States.

WPB Approves Plans to Raise Production of Butyl Rubber

WASHINGTON, D. C.—The War Production Board has formally approved plans of Standard Oil Co. of New Jersey and affiliated companies to increase the planned production of butyl rubber by 70,000 tons above the rate originally scheduled.

This increase will involve no new construction but involves the use of improved techniques previously announced by Standard. Plants now scheduled for completion by Standard Oil Co. of Louisiana and Humble Oil & Refining Co. in the summer and fall of 1943 will produce 130,000 tons of butyl rubber annually instead of the 60,000 tons originally expected.

This process was explained last week by William S. Farish, president of the Standard Oil Co. of New Jersey, appearing before the Gillette committee of the Senate which has been investigating the manufacture of synthetic rubber from grain.

In addition, Mr. Farish defended the use of butylene as the charging stock for making butadiene by the petroleum route, denying allegations which had been made that this would rob the aviation-gasoline program of necessary butylene.

Rail Movement at New Peak

WASHINGTON, D. C.—Tank-car shipments of petroleum and petroleum products to the East Coast district reached the new high level of 800,100 bbl. per day during the week ended July 25, Petroleum Coordinator Ickes announced.

Will Hear Objections on Depletion Allowance Revisions August 10

WASHINGTON, D. C.—The Senate committee on finance has tentatively set Monday, August 10, for hearing objections from the oil industry to the proposal of the Treasury Department to revise the oil-depletion allowance in the present revenue laws.

The bulk of the industry's testimony is expected to be presented through the general depletion committee headed jointly by J. C. Hunter, president of the Mid-Continent Oil and Gas Association, and Russell B. Brown, general counsel of the Independent Petroleum Association of America. As a result of oil-industry protests last spring the House committee on ways and means declined to make any change in present tax provisions for oil-depletion allowance and charging off intangible drilling costs.

Gary Resigns OPC Post to Become Filtrol Corp. President

WASHINGTON, D. C.—Wright W. Gary, who since 1941 has been director of refining for the Office of Petroleum Coordinator, resigned early this week to become president of Filtrol Corp., Los Angeles, Calif.

Mr. Gary, prior to his appointment with OPC, had for 6 years been assistant to the vice president of M. W. Kellogg Co. He was educated at University of Pennsylvania and Stanford University. He has been identified with the oil industry for 21 years, first with Continental Mexican Petroleum Co., which firm he served in refinery positions. He joined M. W. Kellogg Co. in 1929 as director of research and development.

WRIGHT W. GARY

David L. Gray Secretary Of District 3 General Committee

HOUSTON, Tex.—Central offices for the OPC general committee and functional committees of the industry for District 3, comprising Texas, New Mexico, Arkansas, Louisiana, Mississippi and Alabama, were opened last week (Saturday) in the Niels Esperson Building here with David L. Gray, formerly of the marketing division for OPC, in charge as executive secretary.

Decision to open the offices and thus centralize and coordinate the work of the various functional committees, was taken at the regular meeting of the general committee earlier in the week, according to Charles F. Roeser, of Fort Worth, Tex., general chairman.

Included in the reorganized office will be a statistical committee, made up of one man from each of the functional committees, which will compile all the statistical information needed by the Government for the war effort, Mr. Roeser said. Personnel of this committee was to be completed and announced this week.

Otherwise the committees will function as before except that they will be located in a single office instead of being scattered in various parts of the city and will thus be able better to coordinate their work and avoid overlapping and duplication of duties.

Assisting Mr. Gray in the new office will be employes of the functional committees and stenographic and clerical help.

Japs Planned for Operation of Dutch East Indies Oil Field

WASHINGTON, D. C.—Evidence that Japan had been making plans and preparations for taking over and operating the oil fields of the Dutch East Indies and Southeast Asia as early as 1939 is revealed in a study which has been made by the Board of Economic Warfare.

In that year Japanese firms suddenly started buying from the United States large quantities of field equipment now known to have been particularly adapted to the shallow drilling of the Dutch Indies. The purchases increased steadily in intensity through 1940 and continued almost up to the start of the war with the United States.

The equipment was not of a type ordinarily used by the Japanese for drilling in their domestic oil-producing areas and in Formosa or Manchuria, where drilling rigs capable of going to depths of 6,000 ft. were required. Rather it was of a light, portable type, inadequate for depths of much more than 3,000 ft. but ideal for purposes of reconditioning partially destroyed wells or drilling new ones in such areas as Pamoesian, in Tarakan, where production is from depths of only 500 to 1,500 ft.

Eberle Appointed Director Of Transportation for OPC

WASHINGTON, D. C.—William C. Eberle, chief of the marine section, division of transportation, Office of Petroleum Coordinator, Washington, D. C., has been appointed director of transportation for District 1 (East Coast states), Petroleum Coordinator Harold L. Ickes announces. He will make his headquarters in the Chanin Building, New York City.

Prior to going with the Office of Petroleum Coordinator last February, Mr. Eberle was connected with the marine and transportation department of Atlantic Refining Co. Functions of the marine section, OPC, which Mr. Eberle has headed, have been combined with those of the section of inland waterways.

OPA Liberalizes Procedure In Seeking Ceiling Relief

WASHINGTON, D. C.—A more comprehensive provision regarding the granting of relief from the maximum prices established in the petroleum and petroleum products schedules was announced last week by the Office of Price Administration.

By Amendment 23 to Revised Price Schedule 88, the method for applying for relief as set up in the General Maximum Price Regulation is incorporated in the petroleum schedule.

This provides that a seller may file applications for an order of adjustment in accordance with Procedural Regulation 1 if it is shown that the established maximum price causes substantial hardship, is abnormally low in relation to the prices established for competitive sellers and that a maximum price more in line with competitors' prices will not cause an increase in retail prices. Sellers who believe special circumstances not specifically provided for warrant an adjustment of their ceiling prices may present such cases in an application for an order of adjustment. The amendment became effective July 29, 1942.

By Amendment 6 to Maximum Price Regulation 137, which establishes maximum prices for petroleum products sold at retail establishments, substantially the same provisions are incorporated into that regulation. This amendment was effective August 1, 1942.

Fuel-Oil Deliveries Ordered Reduced in Eastern States

WASHINGTON, D. C. — Fuel-oil deliveries on the Atlantic Coast will be further restricted until September 15, the War Production Board ordered last week at the request of the Office of Petroleum Coordinator for War.

The purpose of this provision, it was stated by Petroleum Coordinator Harold L. Ickes, is to build up reserve stocks for next winter's needs.

The delivery control is set up by an amendment (No. 2) to Limitation Order L-56, which provides that:

1. During the period August 3-September 15, there can be no deliveries of fuel oil for the operation of heating and cooling equipment in Area 1, which embraces most of the 17 East Coast states and the District of Columbia. This provision does not apply to fuel oil used for agricultural or industrial processes, or for research operations requiring temperature controls.

2. All the fuel oil to which a person is entitled for use in hot-water heaters between August 3 and September 15 may be delivered in one trip, instead of several trips as heretofore. The quantity delivered may not exceed 50 per cent of the amount used during the same period last year—August 3 to September 15, 1941.

If the amount of oil used for hot-water heaters last year was abnormally high or low, or if no oil at all was used, then the supplier may deliver no more than 50 per cent of the amount that would normally be used this year between August 3 and September 15, 1942.

Heavy Fuel-Oil Conversions Increase to Free Tank Cars

WASHINGTON, D. C. — Voluntary conversions by East Coast consumers of heavy fuel oil continue to soar upward, with a total of 21,232,000 bbl. being saved annually by 784 firms reporting as of July 23, the office of Petroleum Coordinator Harold L. Ickes announces. This is an increase of 1,604,000 bbl. since June 12, when 520 firms consuming 19,628,000 bbl. per year had converted.

Deputy Petroleum Coordinator Ralph K. Davies estimated that probably another 15,000,000 bbl. of heavy fuel oil per year ultimately can be saved by further conversions. This estimate is based on the reports of 2,034 firms that have not converted to coal or some other type of available fuel.

The 58,171 bbl. of oil now being saved daily represents 5,540 tank cars that are thus relieved from service to haul fuel oil for essential Atlantic seaboard needs. (This figure is based on an estimate of 10½ bbl. per car per day, allowing a 20-day round trip from Texas and 210 bbl. per tank car.)

About 135,000,000 bbl. of heavy fuel oils are normally used by East Coast consumers

Demand for Nation-Wide Rationing Growing More Acute

WASHINGTON, D. C.—The shortage of petroleum products in the East Coast region caused many political repercussions in Washington last week, including more demands for nation-wide gasoline rationing.

Several sections in the rationing area are trying to have the rationing restrictions lifted, while other sections charge that insufficient steps are being taken to provide them with oil products and that the situation could be improved if other areas were more severely restricted.

The only definite action during the week was a 6-week ban on deliveries of fuel oil for heating and cooling purposes in the eastern area. The announced purpose of this was to build up stocks, but in some cities dealers declared that stocks are ample and that the order is a prelude to coupon rationing of fuel oil.

Much heat but little light was added to the situation by informal hearings conducted by an "unofficial" committee of the House, headed by Rep. William Fitzgerald of Connecticut. Among others, spokesmen for traveling salesmen pleaded for increased gasoline rations on the ground that business will be disrupted if these men are taken off the road.

Arnold Seeks Legislation to Control Patent Procedure

WASHINGTON, D. C. — Legislation to correct alleged abuses of the patent system by prohibiting patent owners from controlling trade is being sought from Congress by Thurman W. Arnold, assistant attorney general in charge of the anti-trust division of the Department of Justice.

Appearing before the Senate committee on patents last Friday, he made a bitter attack on various types of patent abuses and particularly what he termed patent cartels, citing as an example the much-publicized and now enjoined patent tie-up between Standard Oil Co. of New Jersey and the German I.G.Farbenindustrie. Mr. Arnold is scheduled to continue his testimony this week and to go into considerable detail in attacking patent pools covering petroleum refining and synthetic-rubber production.

For several months this spring the Senate patents committee held extensive hearings on two bills to require compulsory licensing of patents during the war and to make other reforms in the patent system, but no action was taken.

Mr. Arnold has now proposed a new bill which, he said, while not making technical changes in the patent laws which many administration quarters have been advocating for some years, would prevent patents from being used in restraint of trade. One of the means by which this would be accomplished would be a requirement that all patent pools be registered with the Department of Justice and that no infringement suits could be brought without advance notice permitting the department to intervene.

Prices in District 1 Reduced Effective August 5

WASHINGTON, D. C.—Secretary of Commerce Jesse Jones has advised the Office of Petroleum Coordinator that Defense Supplies Corp. has not yet completed details of a plan for absorbing abnormal transportation costs in moving petroleum products to District 1, but that the plan will cover all shipmens of gasoline, kerosene, distillates, residual fuel oil and crude oil made from Districts 2 and 3 on and after August 1. The Office of Price Administration announced simultaneously that effective August 5 prices in the eastern district will be reduced as follows: Gasoline, 2½ cents per gallon kerosene, 0.9 cent per gallon; distillates and light heating oils, 1.1 cents per gallon; residual fuel oils, 15 cents per barrel. These reductions are less than the total increases permitted since January because the Defense Supplies Corp. plan does not reimburse tank-car pool for past losses. OPA also extended to September 1 the effective date of price ceilings on transportation of petroleum products by tank trucks other than common carriers to permit readjustments under order of the Office of Defense Transportation prohibiting use of railroad tank cars on hauls under 100 miles.

Oil City Region Will Get Large War Project

OIL CITY, Pa.—Within the next few days ground will be broken for one of the largest war projects to be constructed in this area. The details of the project are still shrouded in secrecy but it is generally known that Pennzoil Co. in cooperation with Quaker State Oil Refining Corp., Wolf's Head Oil Refining Co. and Continental Refining Co. are making extensive alterations and additions to their jointly owned cracking-plant facilities and, in cooperation with the Government, are erecting additional new facilities for the manufacture of aviation gasoline.

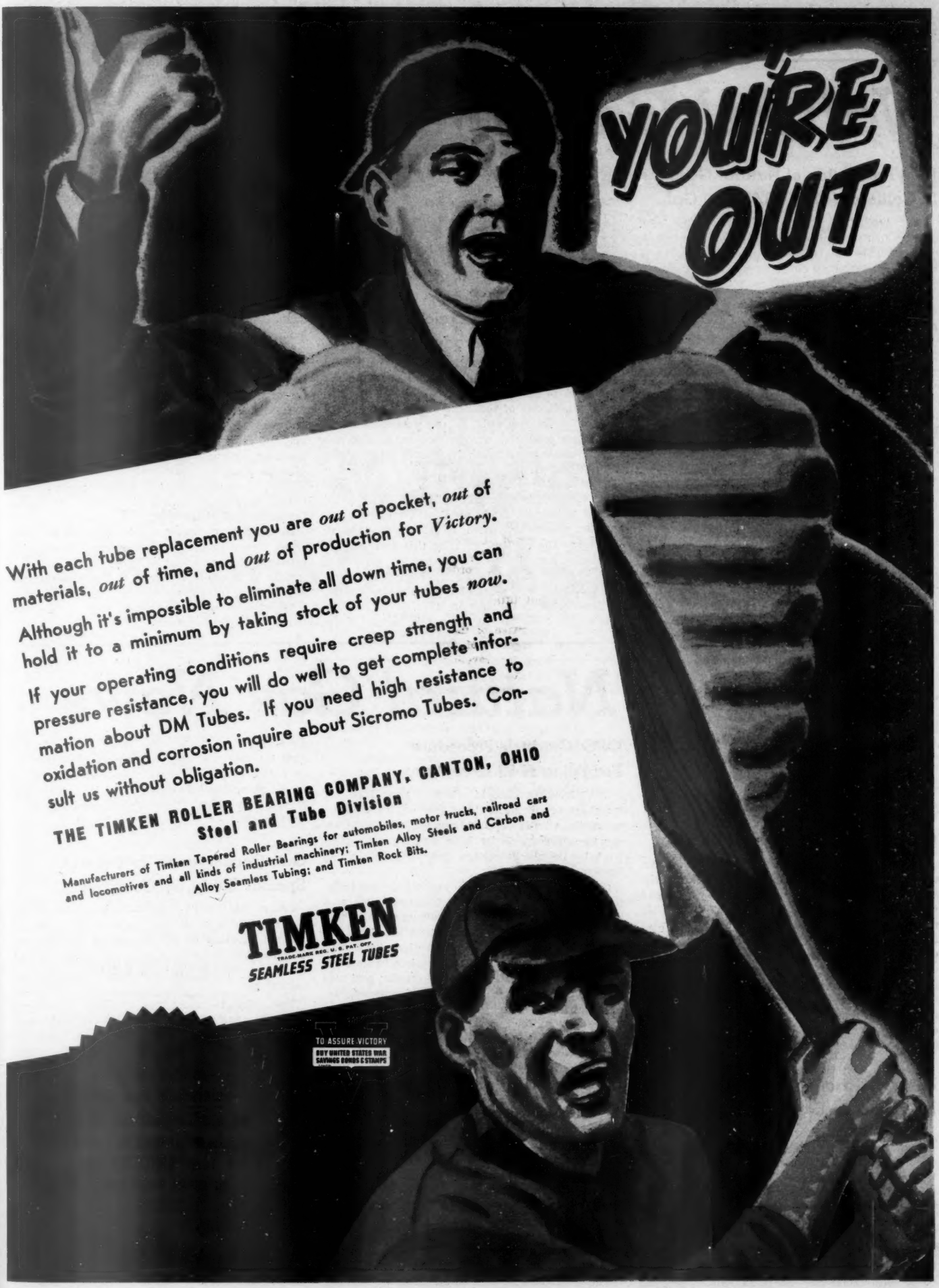
Pennzoil Co. will operate the plant upon its completion and during all construction is supervising the general engineering. Arthur G. McKee & Co., Cleveland, Ohio, have been appointed the general contractors, and it is expected that shortly a local office will be opened up by them.

No information as to the size or capacity of the plant, or the character of the products to be made, has been released by officials of the interested concerns, but it is believed that products from this plant will increase considerably the already large amount of war material produced in the Oil City district.

DEATHS

VAN A. PETTY, 53, San Antonio, Tex., vice president of Petty Geophysical Engineering Co., San Antonio, Tex., died July 28 from a heart attack. Mr. Petty was widely known in the oil industry as one of the pioneer developers of new oil production through geophysics, and had a prominent part in the development of seismograph to its present effectiveness in locating new oil reserves.

SAMUEL DURBIN ROBISON, 91, pioneer oil operator of Pennsylvania, died last week at his home near Oil City, Pa. Mr. Robison was born at Allegany, Pa., and he operated as an oil producer in many fields in Pennsylvania, Ohio, West Virginia and Kentucky. At one time he had nearly 500 producing wells. In the 1870's he became associated with Benson, Hopkins & McKelvey, founders of the Tide Water Pipe Line Co., and drilled many wells with them. At the time of his death he was still operating wells in Allegheny County.



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Natural Gasoline

June Production of Natural Gasoline In California Over 43,000,000 Gal.

LOS ANGELES, Calif. — Natural-gasoline production in California during June totaled 43,338,090 gal. This was from 87 plants processing a total of 25,829,624,000 cu. ft. of gas. Daily capacity of the plants is 1,986,800,000 cu. ft. Production by fields, together with the distribution and disposal of the products, is shown in the following tabulation:

CALIFORNIA NATURAL-GASOLINE PLANT OPERATIONS, JUNE 1942

	Gas treated (M.c.f.)	Natural gasoline produced (gal.)
San Joaquin Valley—		
Belridge	1,353,225	889,765
Elk Hills	36,178	45,027
Kettleman Hills	6,564,276	6,388,037
Midway-Sunset	851,046	1,998,593
Mountain View	106,221	208,768
Miscellaneous	2,320,264	2,096,855
Coastal district—		
Elwood	195,078	178,832
Santa Maria	270,283	457,809
Ventura Avenue	3,425,937	5,092,365
Miscellaneous	654,615	665,250
Los Angeles Basin—		
Brea-Olinda-Coyote	582,200	1,929,448
Dominguez	1,235,693	1,829,076
Huntington Beach	860,818	2,923,258
Long Beach	1,851,273	6,873,186
Montebello	580,785	1,314,241
Richfield	178,605	721,633
Rosecrans	872,408	1,295,184
Santa Fe Springs	1,149,109	4,328,074
Torrance	176,675	642,284
Miscellaneous	2,564,935	3,460,405
Total (all fields)	25,829,624	43,338,090

DISTRIBUTION

	Gallons	Gallons
Stocks beginning of month	1,671,436	
Production during month	43,338,090	
Delivered to refineries		43,406,856
Blended at plants for production of motor fuel		9,812
Losses		87,057
Stocks end of month		1,505,801
Total	45,009,526	45,009,526

Liquefied pet. gas prod. .... 6,650,337 gal. = 158,341 bbl.
Motor fuel production ..... 9,588 gal. = 228 bbl.

Gasoline Association Forms Committee to Aid War Work

LOS ANGELES, Calif.—Creation of a War Activities Committee as a move to coordinate the aid which the natural-gasoline industry can give the war effort has been announced by the California Natural Gasoline Association. Members of the committee include W. W. Robinson, the Texas Co., chairman; William Moeller, Southern California Gas Co.; H. L. Eggleston, Gilmore Oil Co.; P. S. Magruder, General Petroleum Co., and R. D. Gibbs, California Natural Gasoline Association. George L. Tyler, secretary of the association, is ex officio member. Most of these members serve on various government and war committees.

Natural Gasoline Output Decreases in East Texas

GLADEWATER, Tex.—Production of natural gasoline in Railroad Commission Districts 5 and 6, comprising East and East Central Texas counties, totaled 658,892 gal. during June, according to the monthly report of the commission just compiled. This was a decrease of 139,694 gal. from the May production. Of the total June production, 616,434 bbl. was from the East Texas field.

Total gas processed in June by the plants in the two districts was 193,217,000 cu. ft. as compared with 190,146,000 cu. ft. in May. The June gas was from 25,386 oil wells and 147 gas wells. In May plants in the district were connected to 25,593 oil wells and 241 gas wells.

June disposals, according to the report, were: Extraction loss, 29,746,000 cu. ft.; return to leases, 41,869,000 cu. ft.; plant use, 30,463,000 cu. ft.; gas lift, 1,953,000 cu. ft., and vented gas, 35,534,000 cu. ft.

OPA Clarifies Regulations on Ceiling Price for Products

Relationship of prices charged for petroleum products under contract deliveries last fall to the maximum prices which may be charged by sellers to purchasers of the same general class under Revised Price Schedule No. 88 (petroleum and petroleum products) was defined in an interpretation released this week by the Office of Price Administration.

The regulation provides that the maximum price for petroleum products is the lowest price quoted in certain trade publications on October 1, 1941. However, when it is not possible to determine the ceiling price by this method, the regulation provides, in effect, that the maximum is the price charged by the individual seller on the last sale of a particular product during the 60 days prior to October 15, 1941.

The term "sale" is interpreted to include deliveries under contracts which "realistically provide adjustments in placing the parties on a current basis during the 60-day period." Accordingly, in cases where a delivery under a contract so adjustable was the last sale within the 60-day period the price charged on such delivery is the maximum price.

This holds true, the interpretation pointed out, even when the contract contained restrictions on adjustability if these restrictions did not prevent or substantially limit the adjustment of contract prices, during the base period to prevailing market conditions.

Tank-Car Schedules Speeded

WASHINGTON, D. C.—Block movement of oil trains from the Southwest and Mid-Continent is being arranged by the Office of Defense Transportation. Movement of entire trains of oil tank cars, the ODT anticipates, may increase railroad capacity by 100,000 bbl. daily by reducing the turnaround time.

The roundtrip of tank cars between Texas and Mid-Continent loading points and the East Coast may be reduced by 4 to 5 days, ODT Director Eastman anticipates.

As planned by ODT in cooperation with the railroads, 60-car oil trains will be assembled at major producing centers in Texas, Oklahoma, Louisiana and Mississippi.

By making up trains at the oil fields with the entire string of tank cars consigned to one destination, the trains can be moved with the same facility as through passenger trains, although not at passenger train speed.

West-bound empty tank cars will be accorded the same block movement.

Natural Gas News

OPC Clarifies Procedure For Filing M-68 Exceptions

WASHINGTON, D. C.—Correct procedure for members of the natural-gas and natural-gasoline industries who file applications for exceptions under Conservation Order M-68 was explained last week by Deputy Petroleum Coordinator Ralph K. Davies.

Copies of applications for exceptions are to be forwarded to the Director of Natural Gas and Natural Gasoline, Office of Petroleum Coordinator, New Interior Building, Washington, D. C.

The division will handle applications for exceptions concerning the use of materials in natural-gas wells; condensate or distillate wells; and natural-gasoline cycling, pressure-maintenance, or repressuring plants.

Applications for exceptions in other production branches of the industry will continue to be forwarded to the Director of Production, Office of Petroleum Coordinator, New Interior Building, Washington, D. C.

In all cases, three copies of the applications should be sent directly to the division concerned in Washington. A fourth copy should be mailed or delivered to the OPC district director of natural gas and natural gasoline or the district director of production, as the case may be, for the district in which the lease, pool, or plant is located.

Mr. Davies explained that the applications for exceptions in the natural-gas or natural-gasoline branch will be expedited if industry operators will address their copies correctly.

The procedure applies to all three application forms for exceptions under M-68: Form 214-a is used by operators applying for an exception for an entire pool or drilling program; Form 214-b for an exception for an individual lease, property, or well; and Form 214-c for an exception for a cycling plant or a repressuring plant.

Gas Conservation to Receive Special Study by Compact

OKLAHOMA CITY, Okla.—Governors, conservation officials, and oil and gas men will hold the autumn meeting of the Interstate Oil Compact Commission, October 1-3 in Chicago's Palmer House to explore the uses and conservation of natural gas.

New uses have set conservation officials to work on new methods of husbanding this resource, and the Compact Commission, composed of representatives of 12 producing states, is making an intensive study to promote its conservation.

Gov. Leon C. Phillips of Oklahoma, commission chairman, Monday announced acceptance of an invitation from Gov. Dwight H. Green of Illinois to hold the meeting in that state. This will be the compact's first meeting in Illinois. Clarence T. Smith of Flora, Governor Green's official representative, will be in charge of local arrangements.

Standing committees of the compact are already at work on a study of gas production, conservation practices, laws and regulations, and will make reports at the Chicago meeting. Further details of the program will be announced later.

ENGINEERING *and Operating* SECTION

New-Type Multiple-Completion Technique Developed in Illinois

By HARRY F. SIMONS

With the present scarcity of material prevailing, one of the outstanding methods of bolstering the nation's production is through the development of multizone production. This article describes a recently introduced method for the completion of wells in several horizons without the use of a removable section in the casing string.

THE distribution of areas in which a multizone completion is used has increased phenomenally during the past 2 years; however, the principal area in which this technique has been applied is still Illinois. In one field in this state, there are as many as seven producing horizons. All of the wells in the field do not produce from this many zones; as a matter of fact, very few do, but practically every well drilled could have been completed in at least two zones and in many cases, as many as five zones.

Normally, the multizone-completion method used has been one of the following:

1. The use of a removable section in the casing string, opposite the upper pay zone or zones. These removable sections were cut out after the lower zone had been completed and tested. Generally this removable section was either aluminum-alloy pipe or magnesium-alloy pipe which could be cut out, eaten out with acid, or shot out with explosives.

2. The use of black merchant pipe opposite the upper horizons. Here again this section was removed with an expanding tool (either a wall scraper or a mill), after the lower zone was completed.

3. Some operators used the regular casing string, later removing the portion opposite the upper pay zone with an expanding tool, an expanding mill, or a whipstock.

Run Succession of Liners

The new method does not use a removable section and does not require a mill to cut out the pipe opposite the upper pay zones. Actually it is a succession of liners, or a succession of casing sections, run in the well with the portion of the hole opposite the upper pay zones being left uncased.

The procedure, when completing in three zones, is to run either a slotted or blank section of pipe opposite the lower zone and up to the base of the next higher pay. This liner is run on the tubing and is cemented in place. The second liner is run on the tubing and cemented in the hole above the second lowest pay zone and extends to the base of the third and highest pay formation; this liner is, of course, run in on the tubing. The remainder of the casing string is then run to the desired depth and cemented in the regular manner. Fig. 1 shows a well completed by this method. Each of the zones can be shot and cleaned out and produced.

The equipment necessary to perform this type of job is very simple and was developed to meet an emergency situation in which the lower portion of the casing had come loose and dropped down the hole, shutting off the pay formation. In this case, the well was repaired by running a cement retainer as a spear, picking up the fallen section and holding it in place while cementing it. To do this, a sleeve-covered port left-hand sub was developed. This sub was placed between the bottom of the tubing and the cement retainer and allowed normal operation of the cement retainer until it was desired to flush out the tubing and the annulus between the tubing and the casing after placing the cement. To open the port in the sleeve, it is only necessary to drop the appropriate size plastic ball in the tubing. On reaching bottom, it opens the ports and allows circulation through the tubing and annulus.

Before describing the method used for multizone completion, it might be well to point out that this tool has considerable application in the repair of wells.

Repair of Wells

The first job successfully handled by this method was a well where the pipe had been cemented a little too high and trouble was experienced with shale running into the hole. In this case, one joint of 4½-in. regular line-pipe liner was run on the tubing to the bottom inside a string of 5½-in. casing. The liner was then held off bottom and cemented and supported until the cement set, after which the tool was backed off. No trouble was experienced with caving in the well after this job, and other wells were repaired in the same manner. Some of these jobs were performed as long as a year and a half ago and no difficulties have been experienced since that time.

Another type job is the repair of a casing leak by scabbing a liner to the inside of the casing. A recent job at Clay City, Illinois, used 4½-in., 9.5-lb. liner to repair a slit in 5½-in., 14-lb. casing at 2,765 ft. The liner was run in on the tubing with a left-hand, sleeve-covered port sub and 15 sacks of cement placed between the liner and the casing. The liner was held in place until the cement set. If necessary, when performing such jobs as this, the cement can be squeezed into the formation by closing the braden head on the well when

Principal area of multizone production is in the Wabash River valley of Illinois. Picture shows a pair of elevated pumping jacks in the river bottom. In some cases each of the twin wells produces from more than one horizon

there are still five or six sacks of cement left in the tubing. The remainder of the cement is then forced into the formation, after which the sleeve can be sheared and the circulation reversed to hold a pressure on the cement behind the liner and in the formation.

This method of repair has a number of advantages as less time is required to perform such a job. No cement retainer is used, the connection between the liner and the tubing being established through a duplex shoe and the port opening sub. About 20 minutes' time is required to drill out the baffle plate in the duplex shoe.

The left-hand, sleeve-covered port sub can also be used with a retrievable cementer to acidize two separate zones with only one setting. The zones are acidized separately. The bottom zone is acidized first, swabbed, and tested, after which the ball is dropped and the lower zone shut off. The ports in the sub are then opened with a larger ball, and the upper zone acidized and swabbed. The retainer is then released by equalizing the pressure and is pulled from the hole.

Run Liner on Tubing

A recent completion in the Gobbler's Knob area in Illinois (Sections 11, 12, 13, and 14-6s-5e, Hamilton County, Illinois) called for the setting of a liner at 3,317 ft. (total depth) to 3,110 ft. Another liner was then run from 3,064 to 2,949 ft. and a long string was run from the surface to 2,900 ft. The liners and long strings were all 5½-in. pipe. The bottom liner was set in the McClosky sand and both the lower and upper pays perforated. The Aux Vases sand and the Levias sand were opened and were later shot and completed.

The liners were run in on tubing with a duplex shoe on the bottom. A 36-in.-stroke expansion joint and a left-hand sleeve-covered port sub were between the shoe and the tubing. The expansion joint permits backing off without any strain. The first liner was run in to the proper depth and circulation established. Enough cement was run to fill the space between the liner and the hole and approximately 30 per cent excess added. In cases where cavities are known to exist, as much as 100 per cent excess cement is used.

The cement is displaced volumetrically and no plug used. About two or three sacks of cement are left in the tubing to prevent contamination. A bakelite ball is then dropped in the tubing and falls to the top of the cement, after which pressure is applied and the pins holding the sleeve over the ports are sheared. A pressure of 400 lb. is required to do this. After the ports are opened, circulation is carried on from 4 to 6 hours to clean out the cement and condition the mud. The tubing is supported by the elevators and a strain is kept on it during this time. After 6 hours has elapsed, the strain on the tubing is released to make sure the liner is holding in place. The tubing is then backed off by right-hand rotation and pulled from the hole. The next liner can then be run. The mud is conditioned by chemicals for reducing viscosity caused by cement contamination.

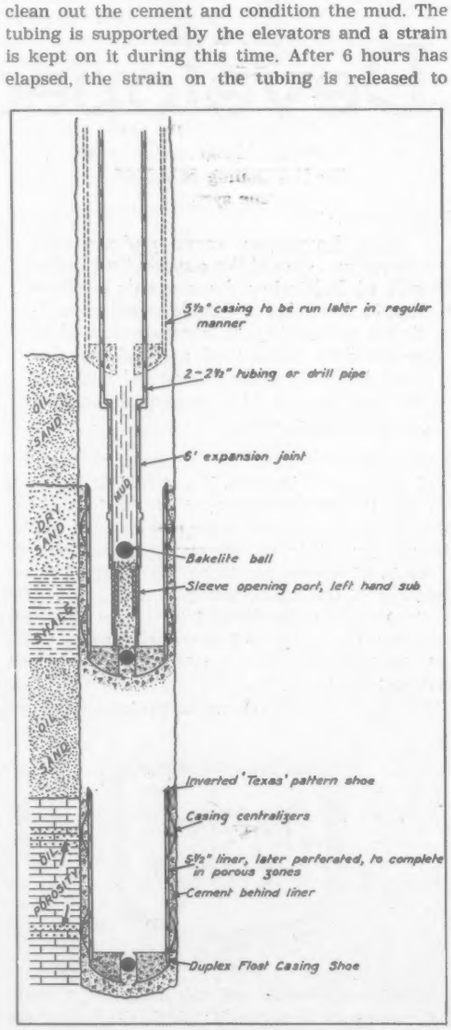

5½" casing to be run later in regular manner
2-2½" tubing or drill pipe
6' expansion joint
Mud
Bakelite ball
Sleeve opening port, left hand sub
Inverted 'Texas' pattern shoe
Casing centralizers
5½" liner, later perforated, to complete in porous zones
Cement behind liner
Duplex Float Casing Shoe

Fig. 1—Schematic drawing showing 5½-in. liner run to bottom in a 7¼-in. hole, exposed oil sand, second liner being run off bottom to protect hole between two upper sands, and regular casing string being run to top of the upper sand

It takes approximately 9 hours to make up the liner, run it to bottom and cement it in place. Where the liner is being hung up the hole, it takes from 13 to 15 hours, as more time is consumed in waiting to make sure the cement has set.

In addition to the duplex shoe on the bottom of each liner run, casing centralizers are run at the top and bottom of the liner and at intermediate points if it is thought necessary. Their purpose is obvious. The top of each liner is also equipped with an inverted Texas pattern shoe. The reason for this tool is the easy entry of the drill string during final completion of the well. The long string of casing above the uppermost pay zone is run and cemented in the regular manner. The zones can then be tested by drilling out the shoes and shooting the uppermost pay being testing first, and so on.

●

New Welding Standards

The American Welding Society has recently publishing two welding standards, entitled "Standard Methods for Mechanical Testing of Welds," and "Definitions of Welding Terms and Master Chart of Welding Processes." Both of these standards were prepared by technical committees of the society and are revisions of earlier bulletins of the same title.

"Standard Methods for Mechanical Testing of Welds" describes in detail the principal mechanical tests applied to welds, including tests for density, soundness, tensile strength, shearing strength, and ductility (bend tests).

"Definitions of Welding Terms and Master Chart of Welding Processes" gives the standard definitions of welding terms adopted by the American Welding Society. The terms are grouped under appropriate headings and subheadings so that closely related terms appear together and their relationships may be more readily understood.

Both of these standards are published in bulletin form, with a heavy paper cover, and are available at 40 cents a single copy from the American Welding Society, 33 West Thirty-ninth Street, New York City.

PHASE BEHAVIOR OF THE ACETYLENE-ETHYLENE SYSTEM

By S. W. CHURCHILL, W. G. COLLAMORE and D. L. KATZ
University of Michigan, Ann Arbor, Mich.*

High-temperature cracking is often practiced in refineries as a means for producing motor fuels of relatively high antiknock value. Such conditions favor the formation of relatively large quantities of hydrocarbon gases. These may be rich in ethylene and contain appreciable quantities of acetylene. The behavior of these gases as a mixture is of increasing importance to the refining industry as they can readily serve as the base stock for the manufacture of many hydrocarbon materials of trade. They are favored because of their high degree of reactivity.

THE critical loci of hydrocarbon systems are an important guide in vapor-liquid equilibria calculations. For ordinary petroleum mixtures the critical temperatures lie between those of the constituents and the critical pressures either lie between or above those of the constituents. Fig. 1 is the critical loci of a series of binary paraffinic hydrocarbon systems.[1] All known paraffinic hydrocarbon systems are of the type shown in Fig. 1.

In contrast to these paraffinic hydrocarbon systems, other systems such as hydrochloric acid and water form constant boiling mixtures known as azeotropes. The critical loci of systems exhibiting azeotropic behavior differ from the critical loci shown by Fig. 1. Kuenen has described such behavior very thoroughly in his book, "Theory of Vaporization and Liquefaction of Mixtures" (German). The critical locus of the nitrous oxide-ethane system presented by Kuenen[1,2] is given by Fig. 2. Isobaric plots of temperature versus composition of the equilibrium vapor and liquid phases for this system will show constant boiling mixtures of the minimum boiling type. Fig. 3 presents the temperature-composition plot for the paraffinic hydrocarbons which have critical loci of Fig. 1 as compared to the temperature composition plot for the system exhibiting azeotropic behavior of the minimum temperature type. Azeotropic mixtures are common when one of the constituents is water or alcohol and the other an organic substance such as a hydrocarbon. However, the existence of azeotropic mixtures among the hydrocarbons present in the petroleum industry is not commonly recognized although Kuenen observed minimum boiling or azeotropic mixtures in the ethane-acetylene system.[3]

*Abstract of report by S. W. Churchill and W. G. Collamore on their research problem as seniors in chemical engineering.

Acetylene-Ethane System

The critical loci and border curve for the acetylene-ethane system reported by Kuenen in 1897[3] are given by Fig. 4. An isobaric plot of temperature versus composition for the equilibrium vapor and liquid phases shows the existence of an azeotrope or a minimum boiling mixture such as is shown by Fig. 3. As acetylene is added to ethane, the mixtures have the type of border curves as shown by curve *E* which has its critical point on the critical locus *ABC*. Those mixtures whose compositions are close to that represented by point *B*, Figs. 4 and 5, have unusual border curves. The dew and bubble point curves become tangent at some pressure and temperature forming what is known as a constant boiling point. The locus of these constant boiling points,

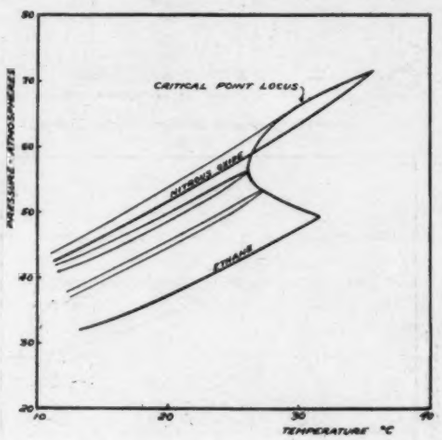


Fig. 2—Nitrous oxide-ethane system. (From Kuenen)

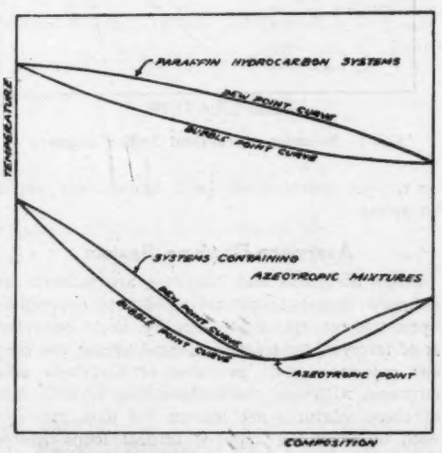


Fig. 3—Typical isobaric temperature-composition plots

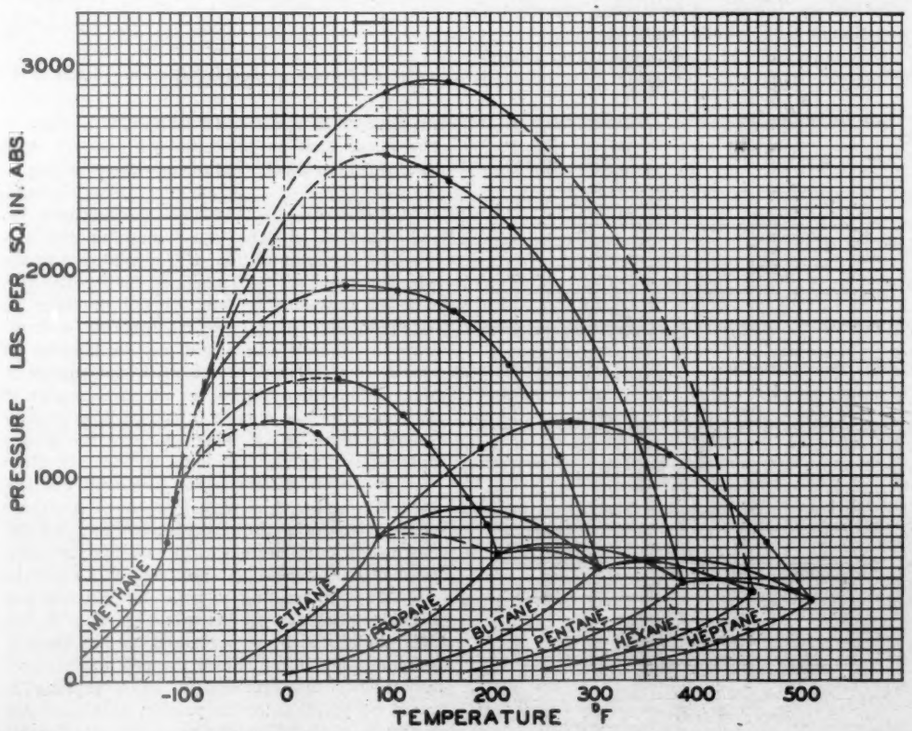


Fig. 1—Critical loci of binary paraffin hydrocarbon systems

curve *BGD* of Fig. 5, is the minimum-temperature curve. Although the range in composition for the constant boiling mixtures in a system may be small, no instance has been reported in which the minimum-temperature curve becomes the border curve for a single azeotropic mixture.

The minimum temperature curve represents the extreme boundary of the region in which two phases may exist.

Vapor liquid equilibria data on such mixtures as the acetylene-ethane system are more complicated because of the formation of azeotropes. In

addition Kuenen had difficulty when running the mixture whose composition approached that of the minimum temperature curve which he described as contamination of his sample by air. Therefore his data do not give vapor-liquid equilibrium constants of value. However, it is obvious that the use of vaporization constants based

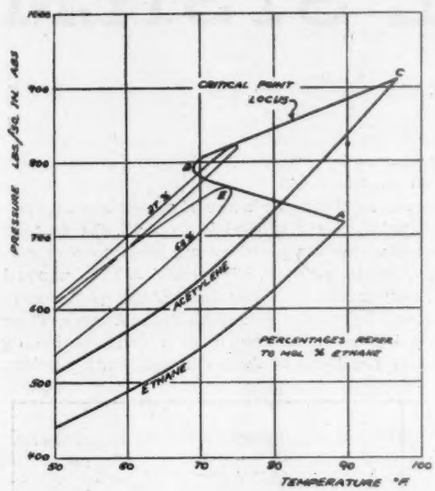


Fig. 4—Acetylene-ethane system. (From Kuenen)

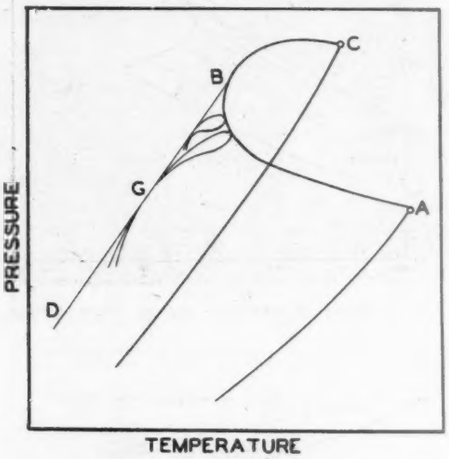


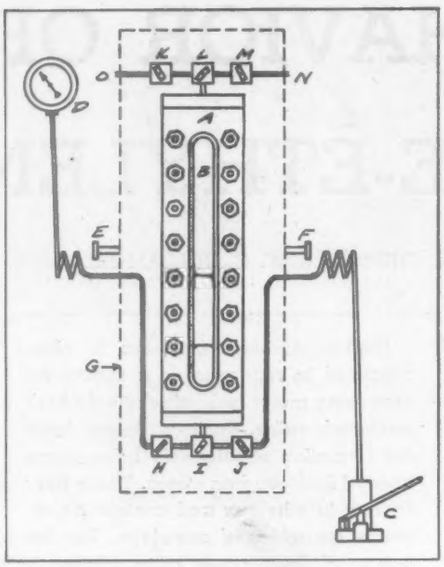
Fig. 5—Behavior of constant boiling mixtures

on the properties of the pure constituents would be useless.

Acetylene-Ethylene System

Since acetylene and ethylene are present in refinery vapors to a varying degree depending upon the conditions of cracking, their behavior is of interest. Data are presented giving the border curves of four mixtures of acetylene and ethylene. Although the compositions of only two of these mixtures are known the data may be used to show the type of critical locus which this system exhibits.

An apparatus similar to one previously described[4] was used to observe the phase behavior. Fig. 6, the diagrammatic sketch of the apparatus, shows the glass-windowed cell which could be rotated to stir the mixture. The total volume of the system and of the individual phases were observed using a graduated scale along the glass window. The equilibrium cell was contained in a constant-temperature air bath. Pressures were measured by Bourdon pressure gages which had been calibrated by a deadweight tester, and were connected to the mercury system used to confine the hydrocarbons. The phase diagrams were obtained by reducing the pressure on a single-phase



A—Jerguson gage
B—Glass window
C Mercury pump
D—Bourdon gage
E F—Trunnion axis
G Air bath
H, I, J—Valves
K, L, M—Valves
N, O—Charging, or sampling lines

Fig. 6—Apparatus—equilibrium cell

fluid through a series of steps into and through the two-phase region in the manner similar to that previous described.[4]

Mixture compositions were obtained by measurement of the quantity of the two constituents charged to the cell. To avoid high concentrations of acetylene, since it is known that it may spontaneously decompose, the ethylene was charged to the cell first with a measurement of its volume, temperature and pressure. The quantity of acetylene added was computed from the final temperature, pressure and volume of the system. The acetylene used was commercial acetylene which was scrubbed by passing through activated silica gel to remove acetone and water and is believed to be about 99 per cent acetylene. The ethylene was purchased from Ohio Chemical Co. and should be of similar purity.

A summary of the experimental data obtained

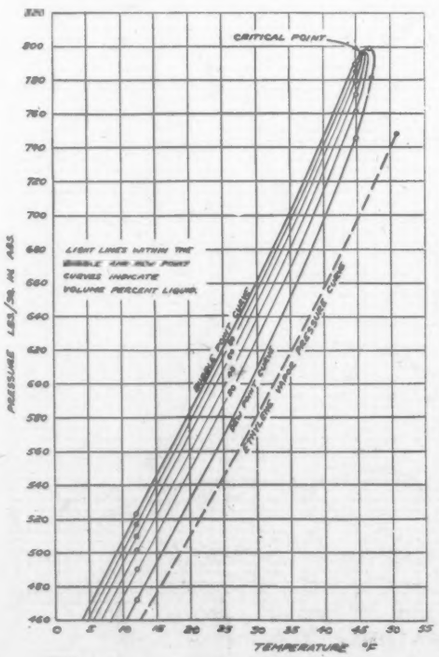

CRITICAL POINT
LIGHT LINES WITHIN THE BUBBLE AND DEW POINT CURVES INDICATE VOLUME PERCENT LIQUID
BUBBLE POINT CURVE
DEW POINT CURVE
ETHYLENE VAPOR PRESSURE CURVE
PRESSURE LBS/SQ. IN ABS
TEMPERATURE °F

Fig. 7—Phase diagram, Mixture B-2

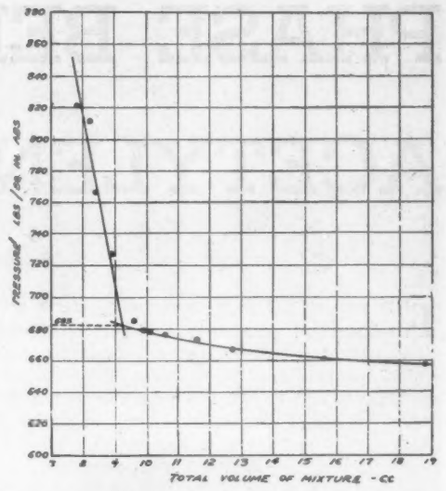


Fig. 8—Location of bubble point (Mixture B-1, 42.8°F.)

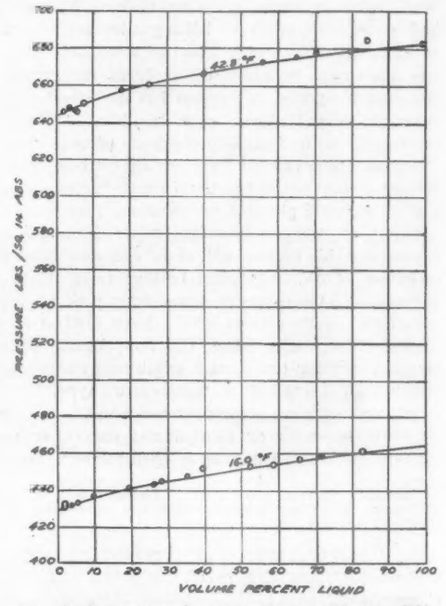
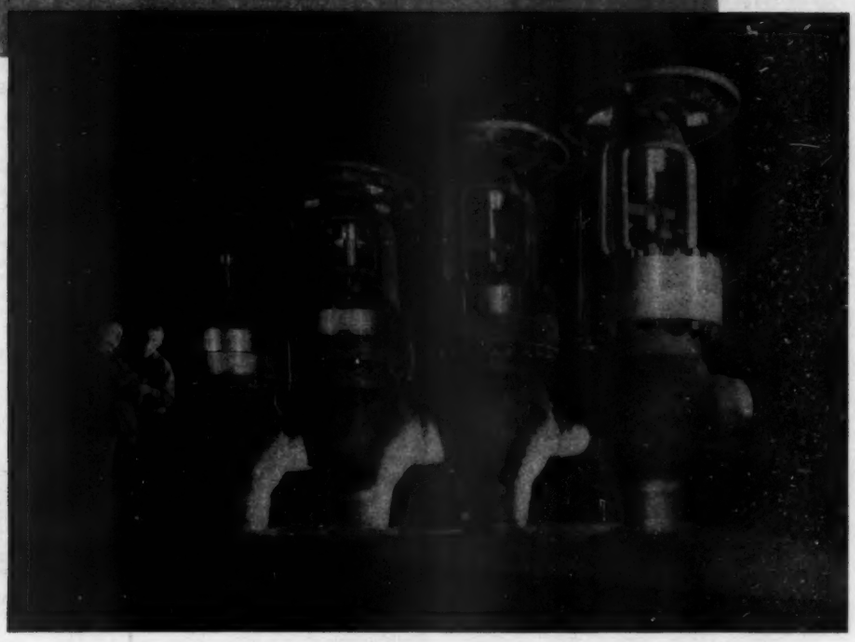


Fig. 9—Percentage liquid isotherms (Mixture B-1)

on these four mixtures is presented in Table 1. The phase data on mixtures A-1 and B-1 were obtained immediately following the charging of the cell. Later data on each of these mixtures gave the information presented as mixtures B-2 and A-2. It is obvious that something had happened to the composition of the mixtures in the cell. The mixtures both changed in the direction of lower acetylene content. During the time between measurements, the entire cell contents were in a single phase and any explanation of loss of sample would not explain the change in composition. Time did not permit investigation of the causes for the change in composition such as chemical reaction or absorption by the gasket material sealing the windows in the cell. However, if no chemical reaction occurred the systems B-2 and A-2 were composed of acetylene and ethylene of a different composition from A-1 and B-1. In case any chemical reaction did occur these mixtures were not acetylene-ethylene mixtures. It is interesting to note that Kuenen had difficulty with one of his mixtures of acetylene and ethane which he explained on the basis of contamination by air. Since the cell was charged by mercury displacement no such explanation would be possible in the present case. Also the system was always under pressure considerably above atmospheric and no air could have entered

Man-Size Valves of CAST STEEL



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the cell over the time interval between experiments.

Phase Diagram

The phase diagram which was the most complete is that for mixture B-2 and is presented in Fig. 7. Fig. 8 gives the location of the bubble point for mixture B-1, while Fig. 9 gives the two-phase region. The 47° F. isotherm of mixture B-2 was the only one which exhibited retrograde behavior since it crossed through two dew points.

Fig. 10 is a pressure-temperature plot for the acetylene-ethylene system including the border curve for the four mixtures studied and the approximate location of the critical locus. The critical temperatures of these mixtures are only approximately located, but are definite enough to clearly indicate the type of critical locus of this system. Since the compositions are not known for two of the mixtures it is not possible to use the information to obtain vapor liquid equilibria relationships.

The ethane-ethylene system has been investigated[6] by Quinn. He obtained results which showed that the border curves of the various mixtures lay between the vapor pressure curves of the pure constituents in such a manner that their critical locus would be expected to be similar to those of Fig. 1.

Fig. 11 presents the critical loci for the three pairs of binary systems possible from ethane, ethylene, and acetylene. Based on the data of Quinn, the ethane-ethylene has the usual critical locus found for the paraffinic hydrocarbon systems. The locus was computed from a recent correlation.[8] The two systems containing acetylene have azeotropic mixtures with critical loci of the minimum temperature type. It is not likely that the full information on vapor-liquid equilibria for the three pairs of binary systems would be of specific use for predicting the behavior of these constituents in the three component systems. Such evidence is already available and is being studied by J. L. McCurdy for his doctorate research at University of Michigan.

In Two-Phase Region

Enough is known to say that ethylene-acetylene mixtures are in the two-phase region at temperatures considerably below the temperature at

TABLE 1—SUMMARIZED ORIGINAL DATA

Temp. °F.	Pressure: Read	Pressure: Actual lb./sq.in. abs.	Total volume: Read	Total volume: cc.	Vapor volume: Read	Vapor volume: cc.	Liquid volume cc.	Per cent liquid volume
LOADING MIXTURE A-1								
(1) Ethylene run in:								
75.8	132	172	9.82	83.3	...	...	...	...
(2) Aceylene run in:								
75.8	223	258	9.83	83.4	...	...	...	...
(3) Ethylene run in:								
75.6	436	460	9.82	83.3	...	...	...	...
RUN NO. 1—MIXTURE A-1								
53.3	1600	No two-phase region observed						
53.3	600	in this range						
RUN NO. 2—MIXTURE A-1								
32.2	855	878	1.50	8.0	Single phase			
32.2	845	867	1.50	8.0	...	...	...	...
32.2	825	846	1.58	8.7	...	...	...	...
32.2	800	820	1.62	9.0	...	...	...	...
30.0	685	706	1.70	9.8	...	...	...	...
29.2	670	691	1.70	9.8	...	...	...	...
29.0	667	688	1.70	9.8	...	...	...	...
28.6	665	686	1.70	9.8	...	...	...	...
27.8	660	681	1.70	9.8	...	...	...	...
27.0	652	673	1.82	10.9	0.88	2.4	8.5	78.0
26.8	650	670	1.88	11.4	0.92	2.6	8.8	77.2
26.5	645	666	2.00	12.60	1.18	5.1	7.5	59.5
*26.4	640	660	2.20	14.25	1.43	7.3	6.95	48.7
26.2	633	653	2.47	16.7	1.80	10.6	6.1	36.5
25.9	622	642	3.02	21.7	2.60	17.8	3.9	18.0
25.6	621	641	3.42	25.3	3.03	21.8	3.5	13.8
25.4	618	638	3.60	27.0	3.35	24.6	2.4	8.9
25.0	603	623	4.52	35.2	Single phase			
RUN NO 3—MIXTURE A-1								
44.8	872	896	2.02	12.7	No two-phase region observed in			
40.8	658	679	4.78	37.6	this range. Aver. temp., 42.8° F.			
RUN NO. 4—MIXTURE A-2								
36.5	730	731	1.61	9.0	Single phase			
36.5	715	719	1.65	9.3	...	...	...	...
...	712	713	1.69	9.6	...	...	...	...
...	694	696	1.70	9.7	...	...	...	...
...	687	689	1.70	9.7	...	...	...	...
36.5	684	686	1.71	9.8	...	...	...	...
...	682	684	1.75	10.2	...	...	...	...
...	681	683	1.78	10.5	...	...	...	...
...	679	681	1.78	10.5	...	...	...	...
...	677	679	1.80	10.7	.87	2.3	8.4	78.5
...	676	678	1.86	11.2	.91	2.6	8.6	76.8
36.5	674	676	1.90	11.6	1.01	3.6	8.0	69.0
36.5	670	672	1.98	12.2	1.10	4.4	7.8	63.9
...	669	671	2.02	12.6	1.19	5.1	7.5	59.5
...	667	669	2.12	13.6	1.36	6.7	6.9	50.7
36.5	665	667	2.19	14.2	1.50	8.0	6.2	43.7
...	660	662	2.37	15.8	1.68	9.5	6.3	39.9
...	659	661	2.40	16.0	1.81	10.8	5.2	32.5
36.5	655	658	2.55	17.4	2.00	12.5	4.9	28.2
36.5	653	656	2.80	19.6	2.30	15.2	4.4	22.4
...	650	653	2.98	21.3	2.62	18.0	3.3	15.5
36.5	647	650	3.09	22.3	2.77	19.4	2.9	13.0
...	644	647	3.21	23.4	2.99	21.4	2.0	8.6
...	643	646	3.40	25.1	3.20	23.3	1.8	7.2
...	642	645	3.51	26.2	3.33	24.5	1.7	6.5
...	637	640	3.78	28.6	3.70	27.9	0.7	2.5
36.5	636	639	3.79	28.7	3.72	28.1	0.6	2.1
...	636	639	3.80	28.8	3.75	28.3	0.5	1.7
...	635	638	3.84	29.2	3.82	29.0	0.2	0.7
36.5	630	633	4.00	30.6	Single phase			
RUN NO. 5—MIXTURE A-2								
18.0	567	569	1.67	...	(?)	Two phases		
...	555	557	1.80	...	1.00	Glass cloudy,		
...	554	556	1.90	...	1.20	interfered with		
...	552	554	2.00	...	1.30	good reading		
...	549	551	1.90	11.5	1.10	4.4	7.1	61.7
...	545	547	2.01	12.7	1.25	5.8	6.9	54.3
...	541	543	2.09	13.2	1.40	7.0	6.2	47.0
...	537	539	2.32	15.3	1.60	8.8	6.5	42.5
...	534	536	2.59	17.7	2.02	12.7	5.0	28.2
...	529	531	2.81	19.8	2.27	14.9	4.9	24.7
...	522	524	3.30	24.2	2.90	20.6	3.6	14.9
...	518	520	3.88	29.5	3.58	26.8	2.7	9.2
...	516	518	4.18	32.2	3.92	29.8	2.4	7.5
...	513	515	4.70	36.8	4.48	34.9	1.9	5.2
...	516	518	4.78	37.6	4.69	36.7	0.9	2.4
...	516	518	4.85	38.2	4.78	37.6	0.6	1.6
...	517	519	5.00	39.5	4.98	39.3	0.2	0.5
LOADING MIXTURE B-1								
(1) Ethylene run in:								
72.4	128	138	9.85	83.6	...	...	...	...
(2) Acetylene run in:								
75.3	247	255	9.90	84.0	...	...	...	...
(3) Ethylene run in:								
75.9	382	388	9.90	84.0	...	...	...	...
RUN NO. 6—MIXTURE B-1								
14.8	457	461	1.57	8.7	.80	1.5	7.2	82.8
...	455	459	1.60	8.9	.90	2.5	6.4	71.9
15.0	453	457	1.68	9.7	.98	3.3	6.4	66.0
15.4	449	454	1.80	10.7	1.10	4.4	6.3	58.9
...	448	453	1.90	11.6	1.22	5.5	6.1	52.6
15.6	447	452	2.01	12.6	1.46	7.6	5.0	39.7
...	443	448	2.15	13.8	1.60	8.9	4.9	35.5
...	440	445	2.42	16.2	1.90	11.6	4.6	28.4
*16.0	438	443	2.78	19.5	2.22	14.4	5.1	26.2
...	436	441	3.10	22.5	2.63	18.1	4.4	19.6
16.2	432	437	3.93	30.0	3.60	27.0	3.0	10.0
...	428	433	4.60	36.0	4.38	34.0	2.0	5.6
...	428	433	4.72	37.0	4.48	34.9	2.1	5.7
...	427	432	5.00	39.5	4.81	37.9	1.6	4.0
...	427	432	5.19	41.1	5.08	40.3	0.8	2.0
17.0	427	432	5.26	41.9	5.15	40.9	1.0	2.4
17.2	426	431	5.45	43.7	5.37	42.8	0.9	2.1
RUN NO. 7—MIXTURE B-1								
44.4	823	821	1.48	7.8	Single phase			
44.4	813	811	1.51	8.2	...	...	...	...
...	767	766	1.54	8.4	...	...	...	...
...	727	727	1.60	8.9	...	...	...	...
43.5	684	685	1.69	9.6	.79	1.5	8.1	84.4
...	678	679	1.71	9.9	.83	2.0	7.9	79.8
...	677	678	1.73	10.1	.94	3.0	7.1	70.3
...	675	676	1.79	10.6	1.03	3.7	6.9	65.1
*42.8	672	673	1.90	11.6	1.19	5.1	6.5	56.0
...	668	667	2.03	12.7	1.45	7.6	5.1	40.1
...	662	661	2.35	15.6	1.91	11.7	3.9	25.0
...	659	658	2.70	18.8	2.33	15.5	3.3	17.6
...	652	651	3.04	21.8	2.86	20.2	1.6	7.3
...	648	647	3.27	24.0	3.13	22.8	1.2	5.0
...	647	646	3.32	24.4	3.17	23.0	1.4	5.7
...	650	649	3.40	25.1	3.30	24.2	0.9	3.6
42.2	647	646	3.50	26.0	3.40	25.1	0.9	3.5
...	646	645	3.50	26.0	3.44	25.5	0.5	1.9
...	640	639	3.65+	27.5+	3.65	27.5	0.0	0.0
41.8	637	636	3.80	Single phase				
RUN NO. 8—MIXTURE B-2								
53.9	1018	1014	1.60	8.9	No two-phase region observed in			
49.6	643	644	4.50	35.0	this range. Aver. temp., 51.8° F.			
RUN NO. 9—MIXTURE B-2								
47.7	807	805	2.16	13.9	Single phase			
47.2	800	799	2.26	14.7	2.24	14.6	0.1	0.7
47.1	796	795	2.27	14.7	...	...	...	...
*47.0	795	784	2.31	15.3	2.23	14.5	0.8	5.2
46.9	790	789	2.38	15.8	2.31	15.3	0.5	3.2
...	787	786	2.46	16.6	2.40	16.0	0.6	3.6
46.3	782	781	2.51	17.2	Single phase			
RUN NO. 10—MIXTURE B-2								
45.7	793	792	1.78	10.5	Single phase			
45.3	788	787	1.80	10.6	.83	2.0	8.6	81.1
...	784	783	1.81	10.7	1.00	3.5	7.2	67.3
...	779	778	1.90	11.5	1.10	4.3	7.2	62.6
*44.9	775	774	2.00	12.5	1.30	6.1	6.4	51.2
44.8	773	772	2.03	12.7	1.48	7.7	5.0	39.4
44.4	746	745	2.80	19.6	Dew point			
RUN NO. 11—MIXTURE B-2								
12.0	517	520	1.49	7.8	.73	1.1	6.7	85.9
...	513	516	1.50	8.0	.81	1.8	6.2	77.5
...	511	515	1.60	8.8	.96	3.1	5.7	64.8
...	505	509	1.63	9.1	1.03	3.7	5.4	59.3
12.0	500	504	1.88	11.5	1.30	6.1	5.4	47.0
...	491	495	2.40	16.2	1.90	11.6	4.6	28.4
...	483	487	3.10	22.5	2.70	19.0	3.5	15.6
...	478	482	3.97	30.4	3.72	28.1	2.3	7.6
...	473	477	4.10	31.5	3.84	28.2	2.3	7.3
...	470	474	4.11	31.6	3.95	30.1	1.5	4.8
...	472	476	4.14	31.8	4.05	31.0	0.8	2.5
...	469	473	4.83	38.1	4.75	37.4	0.9	2.4
12.0	462	466	5.00	39.6	4.96	39.2	0.4	1.0

Note: Bourdon pressure gages—runs 1-3 G-28,921,003; runs 4-11 C2-98.

*Average.

which pure ethylene, the more volatile pure component, has a vapor pressure equal to the total pressure for the mixture. In other words, the equilibrium constants estimated from the properties of the pure constituents would both be below unity although the mixture actually would be in the two-phase region.

Summary

The definite establishment of the acetylene-ethylene system as exhibiting azeotropic behavior is the most important result obtained. This conforms with the earlier work by Kuenen in demonstrating that the ethane-acetylene system has azeotropic mixtures and a critical locus of the minimum-temperature type. The fact that the ethane-acetylene system does not have azeotropic mixtures leads to the conclusion that the presence of the acetylene is the primary cause for the formation of constant boiling mixtures. The vaporization characteristics or equilibrium constants for acetylene when present in such mixtures as ethane and ethylene may therefore differ widely from those which would be predicted from the vapor-pressure relationships when the same physical constants are reviewed for the pure constituents.

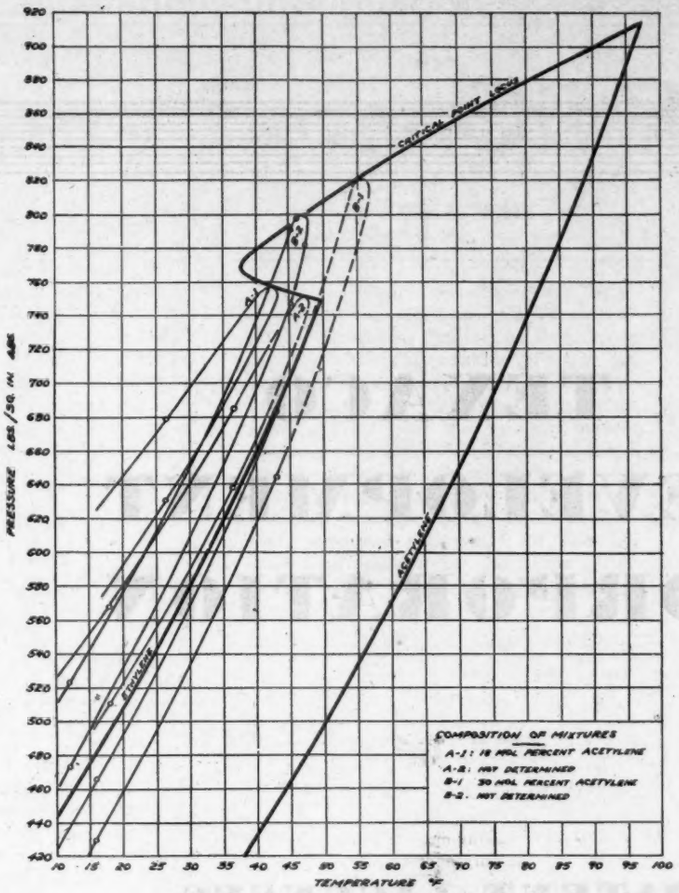

Fig. 10—Acetylene-ethlene system

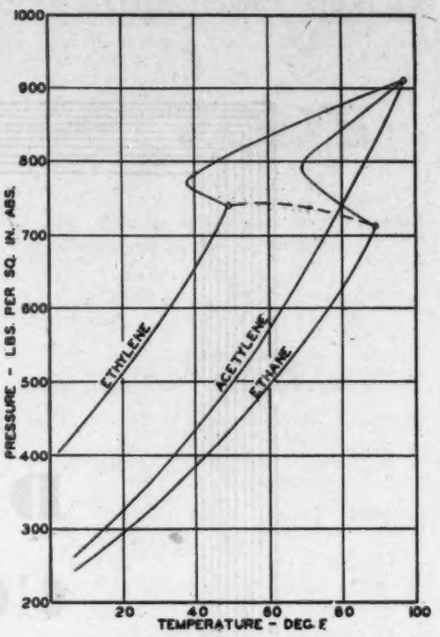

Fig. 11—Critical loci for binary systems of acetylene, ethylene and ethane

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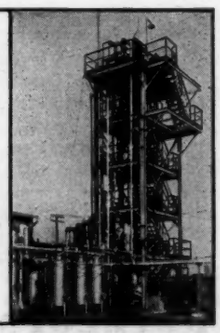
CHEMICALS *from* PETROLEUM

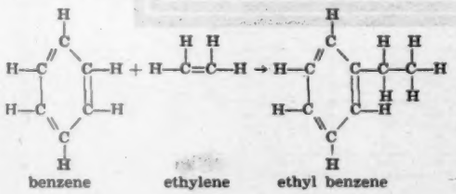
By W. T. ZIEGENHAIN



STYRENE

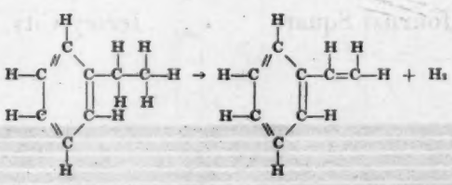
EARLIER in this series (July 23, 1942, p. 34) the synthesis of butadiene was traced through the dehydrogenation of butane to normal butene and then to the finished product. There mention was made of styrene as a material to be polymerized with butadiene to make buna-S rubber.

The chief source of styrene is the alkylation of benzene and ethylene, according to the reaction:



benzene ethylene ethyl benzene

which, upon dehydrogenation, can be converted to styrene, as



ethyl benzene styrene hydrogen

In the refinery the ethyl benzene can be prepared by causing relatively pure benzene and ethylene to unite over a solid phosphoric acid catalyst. The source of the ethylene is preferably ethyl alcohol and processes are being commercially developed to charge ethyl alcohol and benzene together to a dehydrolizing unit and in which the ethylene produced will be joined with the benzene molecule.

The refiner is automatically involved in this synthesis who has a catalytic polymerization process, for that process will provide for the union of the ethylene and the benzene without substantial alteration of the normal refinery polymerization process.

Relatively low pressures and temperatures are involved as in the normal polymerization process and the resulting styrene is easy to handle. It is slightly lighter than water, having a specific gravity of 0.905. It boils at 293° F. and has a vapor pressure of 375 mm. of mercury at 194° F. It has a relatively high octane value in a gasoline blend, being reported variously as from 113 to 137. Because styrene boils within the normal motor fuel range and has such a favorable octane-blending value and vapor pressure, its production on an increasing scale can be warranted of the petroleum industry, whether faced with war or peace.

An alternate method of commercial operation has been suggested in which lower pressure is used in the catalyst chamber but a higher reaction temperature is involved. Toluene is simultaneously produced so that subsequent separation and purification is necessary. Obviously, advantages accrue to the latter plan of operation if the supply of materials of construction favor operating at pressures under 100 p.s.i. and if the production of toluene is desirable.

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Development, Operation and Valuation of Oil and Gas Properties—Part 11

Recovery From Oil Reservoirs

By PARK J. JONES
Petroleum Engineer, The Texas Company

The technique developed by Sage and Lacey under Research Project 37 of the American Petroleum Institute is rapidly becoming routine practice for determining fundamental data on gas-oil mixtures. In this installment Mr. Jones shows how the volume factors determined by the Sage-Lacey method can be used to make accurate estimates of oil recovery by either gas expansion or water drive. This contribution, prepared especially for The Oil and Gas Journal by Mr. Jones, has never before been available to the industry.

LAST week the author discussed recovery of unsaturated oil with no water encroachment, undersaturated oil by 100 per cent water drive, and by expansion of solution gas with no primary gas cap and no water encroachment. Remaining types of recovery are discussed in this installment.—Editor's note.

11. *Oil recovery.*—In the absence of water encroachment, the cumulative recovery C, aside from compaction of media and expansion of interstitial water in the pressure interval $0 < P \leqq P_b$, is defined by

$$C = V_b\,(S_b - S) = V_b\,(\frac{1}{b_b} - \frac{1}{J}) \qquad (9)$$

and the fractional recovery F by

$$F = \frac{V_b\,(S_b - S)}{S_b\,V_b} = (1 - \frac{S}{S_b}) = 1 - \frac{b_b}{J} \qquad (10)$$

The dashed curves in Fig. 33, which correspond to the curves in Figs. 31 and 32, are solutions of Equation 10 for various values of G in a particular reservoir.

1. *Producing efficiency.*—The gas-oil ratio G for the oil remaining in a reservoir depends on the efficiency with which oil is produced. Producing efficiency E for a reservoir having no primary gas cap is equal to original solubility divided by the over-all gas-oil ratio for the oil produced, that is,

$$E = \frac{g_b}{R} \qquad (11)$$

where

g_b = solubility at reservoir bubble-point pressure, cu. ft. per barrel
R = over-all produced gas-oil ratio, cu. ft. per barrel

For example, if the solubility at reservoir bubble-point pressure is 500 cu. ft. per barrel and the over-all gas-oil ratio for the oil produced is 1,000 cu. ft. per barrel, the producing efficiency is 500/1,000, or 50 per cent. In this example, 1 bbl. of oil is left behind in the reservoir for each and every barrel of oil produced.

13. *Effect of producing efficiency on recovery.* The effect of producing efficiency on recovery can be derived as follows: If a fraction F of the oil in place at reservoir bubble-point pressure is produced with an efficiency E,

The fraction of gas produced $= F/E$
The fraction of gas remaining in a reservoir $= 1 - F/E$
The fraction of oil remaining in a reservoir $= 1 - F$

whence, the gas-oil ratio G in a reservoir is defined by

$$G = g_b\,\frac{E - F}{E\,(1 - F)} \qquad (12)$$

The solid curves in Fig. 33 are solutions of Equation 12. These curves illustrate the effect of producing efficiency on recovery from a particular reservoir having no primary gas cap.

Other things being equal, producing efficiency for primary methods of production depend on effective permeability. For example, if the effective permeability permits stratification of gas to form secondary gas caps, producing efficiency can be relatively high, provided the evolved gas is not produced. On the other hand, if the effectively permeability varies, say fifty-fold as between contiguous pay intervals, producing efficiency can be as low as 15 per cent because gas is bled off from the relatively tight intervals without producing its quota of oil.

D. Recovery of oil by expansion of solution and primary gas-cap gas; no water encroachment.

14. *Original gas-oil ratio.*—If an oil reservoir has a primary gas cap, the original reservoir gas-oil ratio G_1 can be derived as follows: Let

P_1 = initial reservoir pressure
V_1 = initial reservoir space, barrels
yV_1 = reservoir space initially occupied by free gas, barrels
$(1-y)\,V_1$ = reservoir space initially occupied by bubble-point oil, barrels
g_1 = solubility at P_1, cu. ft. per barrel oil
b_1 = volume factor for bubble-point oil at P_1, barrels reservoir space per barrel oil
$e_1 = 0.00504\ TZ/P_1$, barrels reservoir space occupied by 1 cu. ft. of free gas at P_1

so that

A. Quantity of oil originally in place $= (1-y)\,V_1/b_1$ barrels of oil.

B. Quantity of gas originally in solution $= g_1\,(1-y)\,V_1/b_1$ cu. ft.

C. Quantity of free gas originally in place $= yV_1/e_1$ cu. ft.

D. Total volume of gas originally in reservoir $=$

$$V_1\,[\frac{g_1}{b_1}\,(1-y) + \frac{y}{e_1}]\ \text{cu. ft.}$$

Whence, it follows that the original reservoir gas-oil ratio G_1 is equal to (D) divided by (A), that is,

$$G_1 = g_1 + \frac{b_1}{e_1}\,(\frac{y}{1-y}) \qquad (13)$$

15. *Volume factor.*—The initial volume factor J_1 corresponding to the original gas-oil ratio is defined by

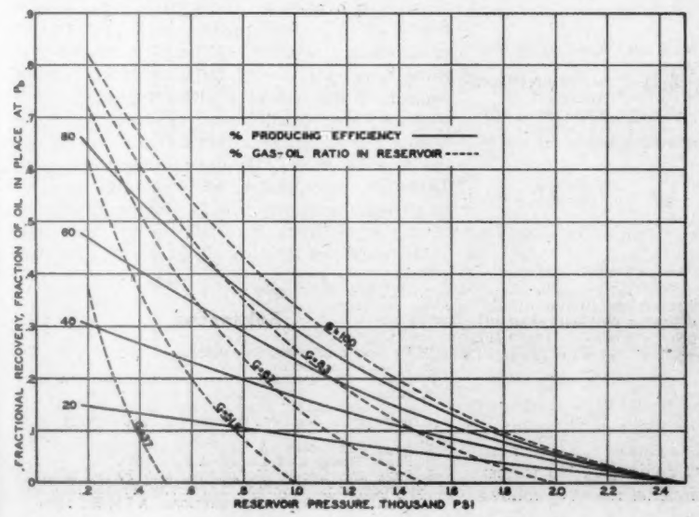
$$J_1 = b_1 + B_1 = b_1 + 0.00504\,\frac{TZ}{P_1}\,(G_1 - g_1)$$

By substituting the expression for G_1 in the foregoing equation, it can be verified that

$$J_1 = b_1\,(1 + \frac{y}{1-y}) = b_1\,(1 + r) \qquad (14)$$

where $r = y/(1-y)$ is the ratio of reservoir space initially occupied by a primary gas cap to the space initially occupied by bubble-point oil.

The volume factor J corresponding to any pres-


% PRODUCING EFFICIENCY
% GAS-OIL RATIO IN RESERVOIR
FRACTIONAL RECOVERY, FRACTION OF OIL IN PLACE AT Pb
RESERVOIR PRESSURE, THOUSAND PSI

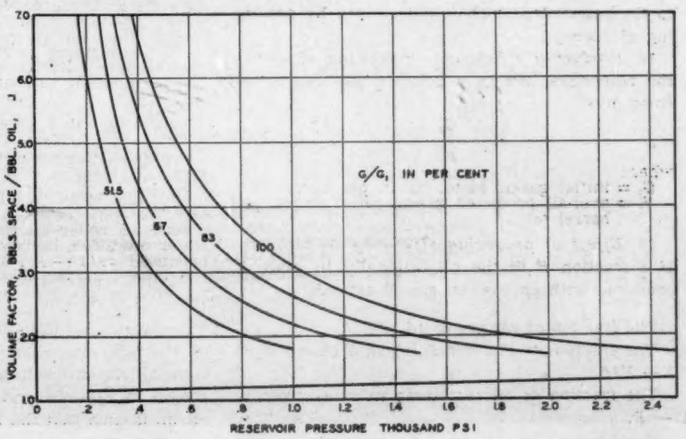
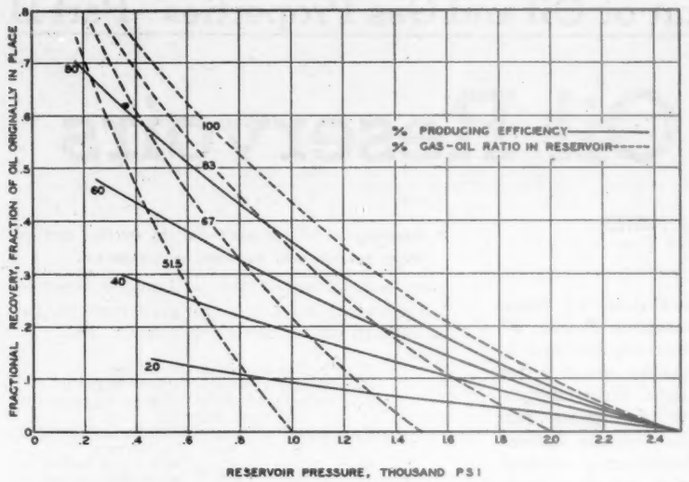


Fig. 33 (left)—Recovery vs. pressure for various producing efficiencies; no water encroachment; no primary gas cap. Fig. 34 (below)—Volume factor vs. pressure in a reservoir having a primary gas cap



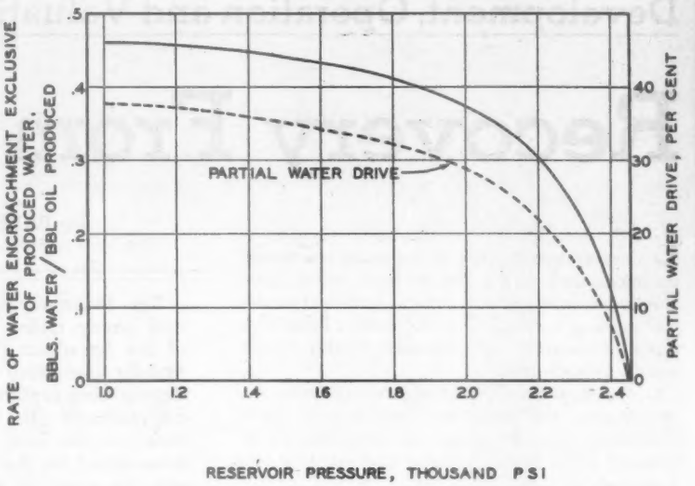

RATE OF WATER ENCROACHMENT EXCLUSIVE OF PRODUCED WATER, BBLS. WATER / BBL. OIL PRODUCED
PARTIAL WATER DRIVE
PARTIAL WATER DRIVE, PER CENT
RESERVOIR PRESSURE, THOUSAND PSI

Fig. 35 (left)—Fractional recovery vs. producing efficiency for a reservoir having a primary gas cap. Fig. 36 (right)—Partial water drive vs. pressure

sure $P<P_1$ is given by

$$J = b + 0.00504\frac{TZ}{P}(G-g) \qquad (15)$$

where
G = all the gas associated with oil, cu. ft. per barrel
g = solubility at T and P, gas in solution, cu. ft. per barrel oil
$G-g$ = free gas associated with a barrel of oil, cu. ft. per barrel.

The curves in Fig. 34 are solutions of Equation 15 for a particular reservoir in which the space ratio $r = 0.3$ and the original gas-oil ratio $G_1 = 943$ cu. ft. per barrel of which 567 cu. ft. per barrel were originally in solution, that is, $g_1 = 567$.

16. *Saturation.*—The original saturation S_1 for reservoirs having a primary gas cap is defined by

$$S_1 = \frac{1}{b_1(1+r)} = \frac{1-y}{b_1} \qquad (16)$$

and the saturation corresponding to any pressure $P<P_1$, by

$$S = \frac{1}{b + 0.00504\frac{TZ}{P}(G-g)} \qquad (17)$$

17. *Oil recovery.*—Cumulative recovery C for no encroachment of water into reservoirs having a primary gas cap is defined

$$C = V_1(S_1 - S)$$

and the corresponding fractional recovery F, by

$$F = \frac{C}{S_1 V_1} = 1 - \frac{S}{S_1} = 1 - \frac{b_1(1+r)}{b + 0.00504\frac{TZ}{P}(G-g)} \qquad (18)$$

The dashed curves in Fig. 35 are solutions of Equation 18 for a particular reservoir having the volume factors of Fig. 34. These curves correspond to the gas-oil ratio G for the oil remaining in the reservoir, which is determined by producing efficiency.

18. *Producing efficiency.*—Producing efficiency for reservoirs having a primary gas cap is defined by

$$E = \frac{G_1}{R} \qquad (19)$$

where
G_1 = initial gas-oil ratio, cu. ft. per barrel
R = over-all produced gas-oil ratio, cu. ft. per barrel oil

19. *Effect of producing efficiency on recovery.* If a fraction F of the oil originally in place is produced with an over-all gas-oil ratio R,

The fraction of gas produced = F/E

The fraction of gas remaining in a reservoir = $1 - F/E$

The fraction of oil remaining in a reservoir = $1 - F$.

Whence, the gas-oil ratio G for the oil remaining in a reservoir is defined by

$$G = G_1\frac{E-F}{E(1-F)} \qquad (20)$$

The solid curves in Fig. 35 are solutions of Equation 20. These curves illustrate the effect of producing efficiency on recovery from a particular reservoir having a primary gas cap.

D. Recovery of oil by partial water drive.

20. *Partial water drive.*—As already stated, if the rate of water encroachment maintains pressure at, or above, reservoir bubble-point values, such rates of water encroachment are referred to as 100 per cent water drive, or simply as water drive. declining, some of the oil is produced by gas expansion and only a fraction of the oil recovery is caused by encroachment of water. Under these conditions, water encroachment is referred to as partial water drive. The magnitude of a partial water drive is conveniently expressed in terms of the oil recovery caused by water encroachment. For example, a 50 per cent water drive means that one-half of the total oil recovery as of a given date resulted from water encroachment. The other 50 per cent of the recovery resulted from expansion of evolved solution gas and expansion of primary gas-cap gas if present. Rates of water encroachment into oil reservoirs are also expressed as so many barrels of water per barrel of oil produced.

The rate of water encroachment and the degree of a partial water drive are determined with the aid of volumetric curves of the type shown in Figs. 33 and 35. Let

$S_1 = 1/J_1$ = original saturation, barrels oil per barrel reservoir space
F_w = fractional recovery by partial water drive, fraction of oil originally in place
F = fractional recovery by gas expansion corresponding to F_w
b = volume factor for bubble-point oil corresponding to F and F_w

then

Saturation at a given time for partial water drive = $(1 - F_w)S_1$

Corresponding saturation for no water encroachment = $(1 - F)S_1$

Oil produced by partial water drive = $(F_w - F)S_1$

Rate of water encroachment exclusive of the water produced, barrels of water per barrel of oil produced = $(1 - F/F_w)\,bS_1$ (21)

Partial water drive express in per cent = $100\,(1 - F/F_w)\,S_1$ (22)

Application of Equations 21 and 22 is illustrated by the following example: The rate of recovery from a field (the volumetric curves for which are shown in Figs. 34 and 35 down to 1,000 lb. per sq. in. is such that the fractional recovery follows the 60 per cent efficiency curve, whereas the producing efficiency is only 20 per cent. What is the rate of water encroachment and the degree of the partial water drive?

The following values are obtained from Figs. 34 and 35:

P	2,500	2,000	1,500	1,250	1,000
S_1	0.577	....	....	....	....
b	....	1.294	1.259	1.244	1.224
F_w	0	0.070	0.165	0.220	0.275
F	0	0.035	0.065	0.080	0.095

Substitution of the above values in Equations 21 and 22 gives the curves shown in Fig. 36. The rate of water encroachment in Fig. 36 is exclusive of the water produced. The total rate of water encroachment is obtained by adding the produced water-oil ratio to the value given by Equation 21.

It should be emphasized that the producing efficiency resulting from partial water drive can be extrapolated to abandonment to obtain ultimate recovery only, if it is certain that the extent of bypassing of oil by water down to abandonment is less than the difference between unity and the apparent producing efficiency by a sufficient amount. For example, the 60 per cent apparent producing efficiency in the foregoing illustrative problem does not mean that the ultimate recovery will be 60 per cent of the oil originally in place. The ultimate recovery in this example may be greater than, equal to, or even less than, 60 per cent, depending on how much the extent of bypassing of oil by water is less than 40 per cent.

More generally, it can be said that ultimate recovery by water drive and by partial water drive depends on bypassing. The significance of bypassing of oil by water is analogous to gas-oil ratios or producing efficiency. The ultimate recovery from reservoirs having no water encroachment depends on the over-all or ultimate producing efficiency. The ultimate recovery from reservoirs having a water drive, either 100 per cent or partial, depends on the over-all or ultimate bypassing. Therefore, extrapolation of cumulative recovery to abandonment pressure to obtain ultimate recovery is likely to be erroneous in most cases unless corrected for ultimate producing efficiency and ultimate bypassing.

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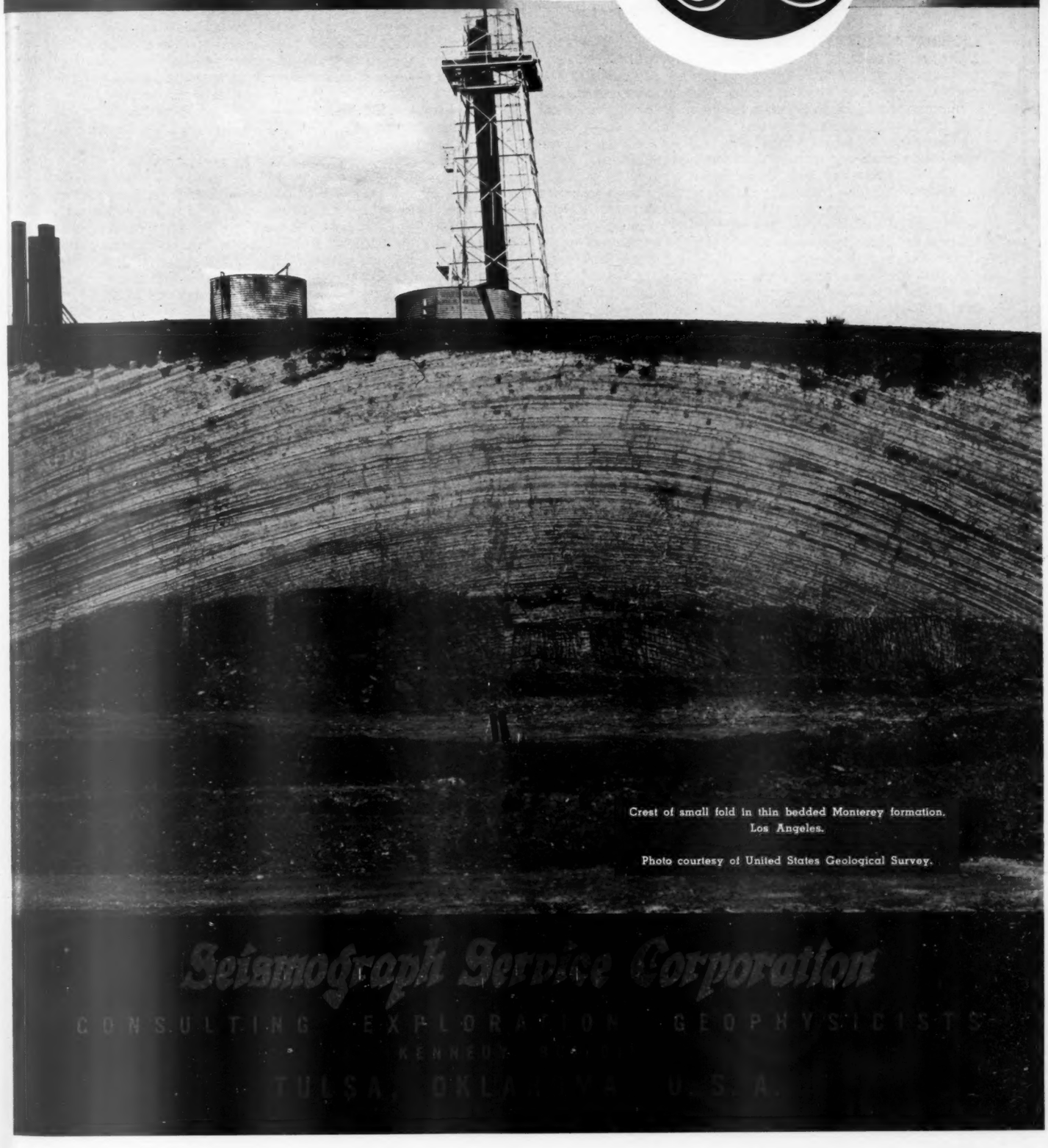


Crest of small fold in thin bedded Monterey formation.
Los Angeles.

Photo courtesy of United States Geological Survey.

Seismograph Service Corporation

CONSULTING EXPLORATION GEOPHYSICISTS

KENNEDY BUILDING

TULSA, OKLAHOMA, U.S.A.

TYPICAL OIL-FIELD STRUCTURES

Salt Dome

Esperson and Barbers Hill, Coastal Texas

(Compiled by The Oil and Gas Journal)

GENERAL GEOLOGY: The salt domes of the Texas and Louisiana Gulf Coast lie on a coastal plain which has been an area principally of subsidence since the Mesozoic. Based on the occurrence of salt in the Jurassic in Arkansas and in a number of interior salt domes between the coast and these salt beds, it is generally assumed that the salt in the coastal domes is also of Jurassic age. They extend from the Mississippi delta southwestward to Jackson County, Texas.

The formations in the coastal plain outcrop in a series of belts which are roughly parallel to the Mexia-Balcones fault systems in the hinterland and as they progress upward and outward become more nearly parallel to the present coast. They range in age from Lower Cretaceous to Pleistocene and despite the great thickness of the section on the Gulf, there are many gaps in the section. Many of the formations grade outward from continental to marine beds and although there are many sands, the bulk of the section is unconsolidated clays.

STRUCTURE: In the gently dipping coastal plain, there are some reversals of dip of which many are believed to be associated with deep-seated salt domes. In other cases, drilling has disclosed the presence of salt. In still other cases, plugs of salt generally surmounted by a cap of anhydrite and calcite have pushed their way upward to near the surface. There are, therefore, three types of sale dome, piercement, nonpiercement and hypothetical.

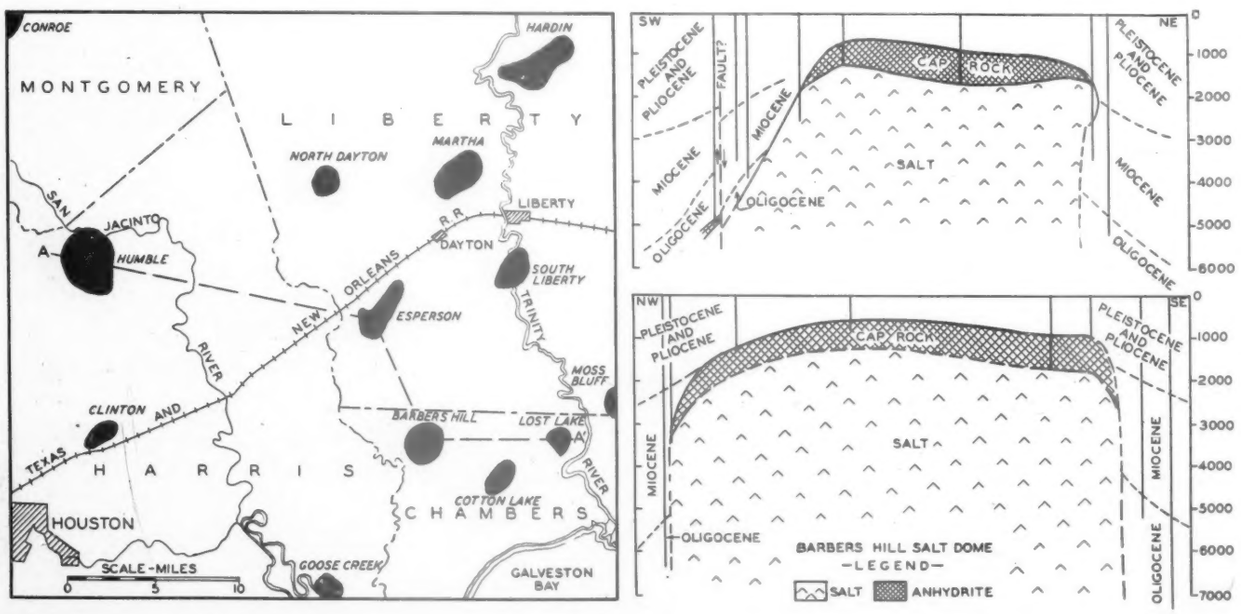
The known piercement domes are plugs with a subrounded outline and very steep sides. In some cases the sides are vertical and in others there is an overhang caused by the mushrooming of the top of the dome. These are almost the only structures known which can be represented by cross-sections in which the vertical scale is not exaggerated. The piercement type of dome has risen, relative to the rest of the surrounding region and the beds flanking them have been pushed upward against the flank beyond the point of rupture so that the salt projects through them. The nonpiercement domes are thus domes which may be piercement domes but which have not yet been determind as such.

There are many theories as to the origin of the salt domes. Some hold that they have actually been forced upward by the weight of overlying sediments on the plastic and semifluid salt. This is more probable in the European salt dome regions, where the vertical load has been augmented by mountain-building thrusts farther inland. The very irregular distribution of the top of the coastal domes combined with the uniformity of the load along the strike makes it necessary to explain why some domes should have risen several thousands of feet higher than others.

Another theory suggests that the domes tended to remain where they were while the rest of the area subsided. Under this theory, the domes grew by downbuilding, the salt being squeezed out and forming a pillar which supported the upper part of the dome. According to this theory, when there was insufficient salt added to the bottom to support the dome, it sank with the remainder of the area.

The anhydrite caps over many domes are considered to be residual material left behind as the salt was dissolved by ground water, and surface depressions around some domes indicate that this process is still going on.

OIL-BEARING HORIZONS: The oil pays associated with salt domes consist of supracap sands, the cap rock itself and flanking sands. They include many horizons from the Pliocene to the lower Wilcox (basal Eocene). Owing to the



Oil-field map of area around Esperson and Barbers Hill domes (left) and cross-sections across Barbers Hill dome (right)

fact that most of the known piercement domes are relatively near the coast, most of the flanking sands are of Miocene or of Pliocene age.

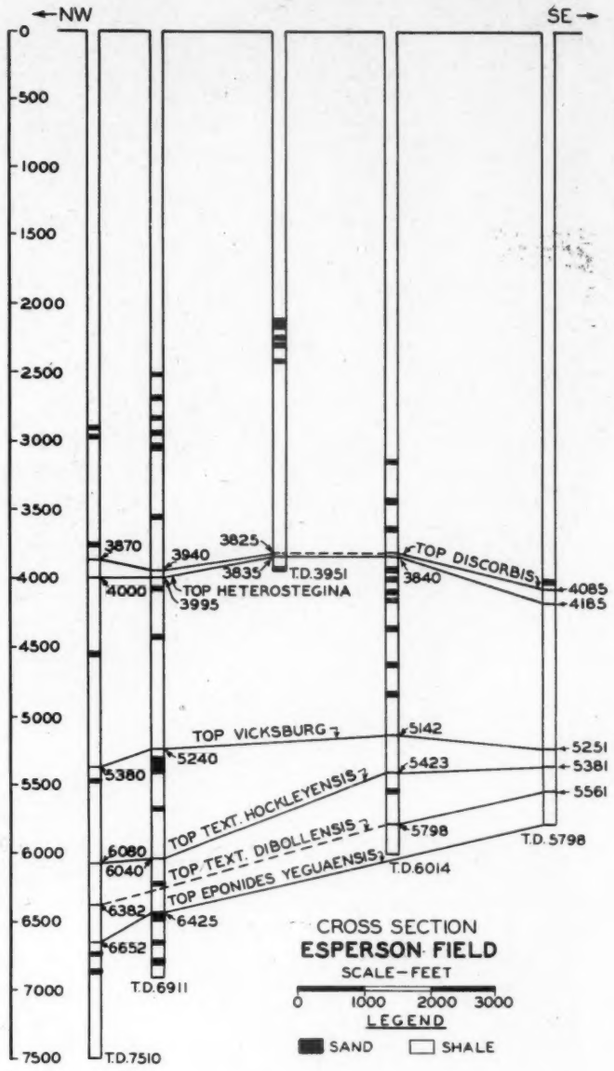
ORIGIN OF THE OIL: The oil in the cap rock appears to have migrated from the formation in which it was originally formed. It is quite possible that this oil collected on the flanks of the dome and as the oil-bearing formation was pierced, either by uplift of the dome or by subsidence of the sediments around it, the oil was able to move across the contact. The oil in the flanking beds and also in the supra-cap reservoirs appears to be indigenous to the pay horizons as each pay has oil of a character noticeably different from that contained in other pays on the same structure.

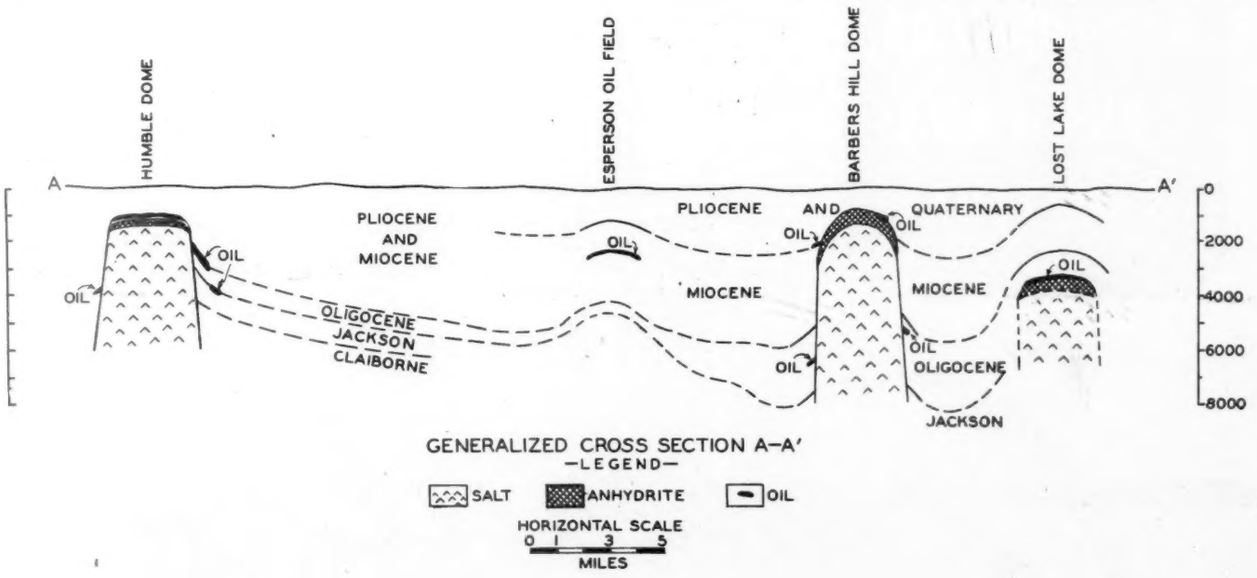
The pay horizons are sands deposited relatively near shore and the marked thinning and gradation of many formations show that the movement, although predominantly downward, was oscillatory, giving rise to a large number of shoreline and near-shore deposits.

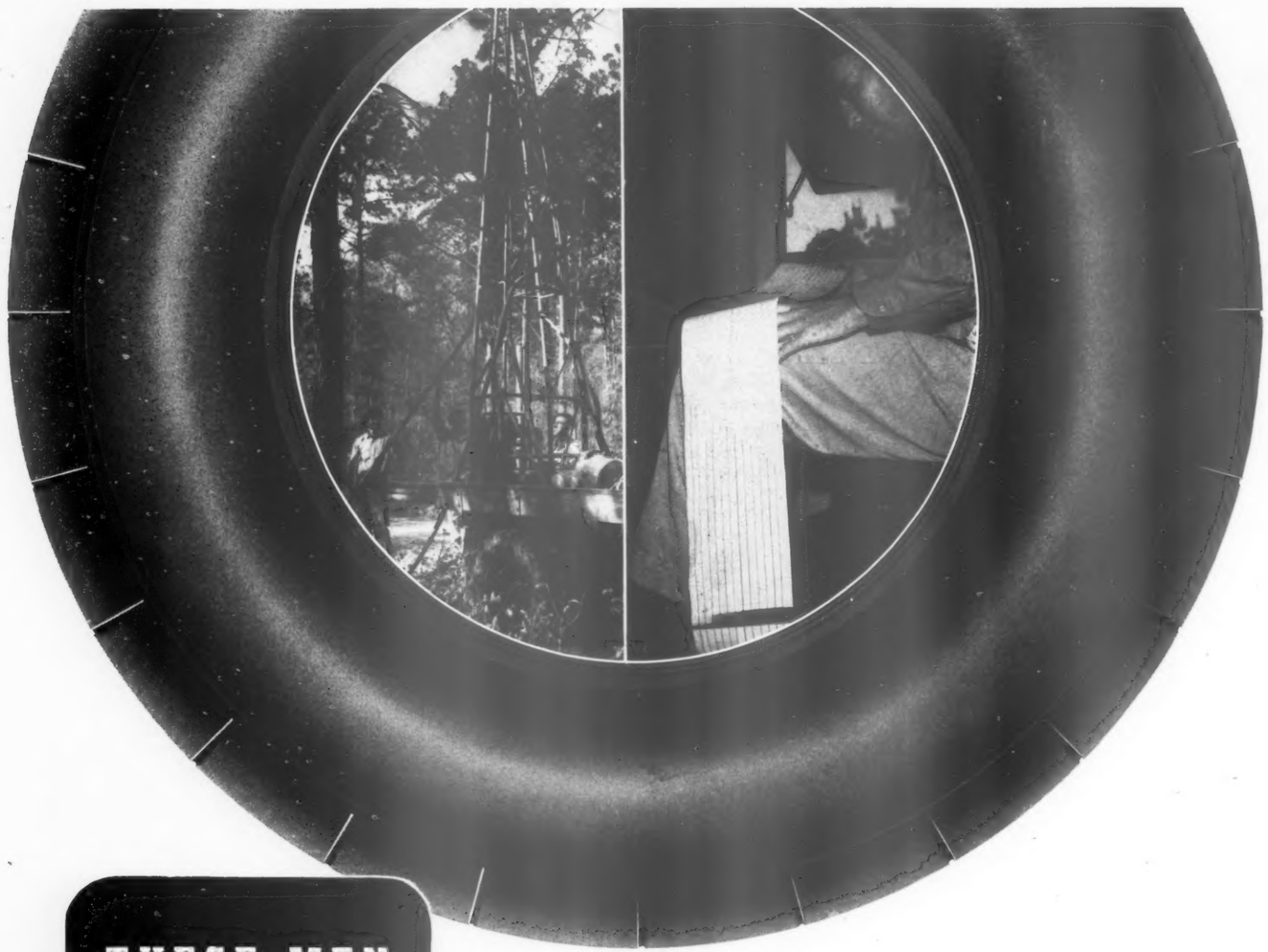
OTHER FIELDS OF THE SAME TYPE: There are no salt domes similar to those of the Gulf Coast in other parts of the United States with the exception of the interior salt domes of East Texas and Central Louisiana and some small unimportant domes in Duval County. In the Isthmus of Tehuantepec there are also salt domes. In Europe, the deposits of the north German plain and of Rumania are associated with salt domes and in Germany these range from the subrounded coastal type to strongly folded diapir domes closer to the Alps.

EXPLORATION METHODS: The earliest found domes were located on the basis of surface exposures, hills or direct evidence of the occurrence of oil. These were generally shallow domes. When these had all been found, two geophysical methods, the refraction seismograph and the torsion balance were developed and additional large salt dome fields were located by these methods owing to the great difference between the domes and the surrounding formations. Gradually the refraction seismograph was superseded by the reflection seismograph and the torsion balance by the gravimeter and exploration continued at an accelerating rate. Today it may be considered that geology has been almost entirely superseded by geophysics in coastal prospecting and in one major district, southeastern Louisiana, not a single field is credited to geology.

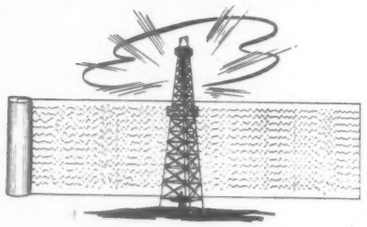
Principal references: Deep Sand Development at Barbers Hill, Chambers County, Texas, by P. C. Murphy and Sidney A. Judson, A.A.P.G. Bull., Vol. 14, No. 6. Esperson Dome, Liberty County, Texas, by W. L. Goldston Jr., and George D. Stevens, Gulf Coast Oil Fields, pp. 857-879.







THESE MEN MAY BE "GROWING" THE RUBBER FOR YOUR POST-WAR TIRES



High grade, durable synthetic rubber from oil is no longer a laboratory experiment . . . probably much of the rubber to be used in the final, the *victory* stages of our present war will be synthetic rubber from oil. And when America resumes its normal life after the war, automobile tires and many of the other products now made of rubber will be made from synthetic "oil" rubber. Naturally these uses are increasing and will continue to increase our demand for oil. Future uses and demands, yes . . . but the oil must be taken from future oil reserves, too.

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Fabricating Piping Systems By Electric-Arc Welding (Part 4)

By A. M. HILL
Superintendent of Line Maintenance,
Stanolind Pipe Line Co.

In this article which concludes a series discussing improvements in pipe line welding shop practices the author describes equipment and methods which have been devised for reducing hazards and increasing the general efficiency of welding shop operations. These procedures may be applied in welding shops of refineries, gasoline plants and natural-gas transmission lines as well as to those of crude oil and products lines.

IT has been proved that pride of workmanship and good housekeeping are essential to efficiency and safe working conditions in a welding shop. In addition to the special equipment described in preceding installments, there are several factors of secondary importance which will be discussed below.

In Fig. 15 oxygen cylinders, an electric welding machine, acetylene regulators and pinch bars are shown in an orderly arrangement. It will be noted that the oxygen cylinders are supported in their rack by a metal band to prevent them from falling and damaging the regulators, or possibly exploding and injuring the workmen.

In Fig. 16 it will be noted that the electric welding machine is supported above the floor on the steel cabinet. A place is provided in this cabinet for storing welding electrodes where they are readily available for the welder. In the center background of the picture are shown several different sizes of counterweights of the type previously described. Fig. 17 shows an interior view of a steel work bench which is equipped with drawers and shelves for storing small hand tools. The top of this bench consists of a steel plate approximately 3 in. thick which is used very advantageously in the fabrication work. It will be noted that all welding cables and acetylene welding hose are supported by steel hooks attached to a trolley on an overhead wire cable. With this equipment the welding cables and hose are suspended above the floor and protected from damage by the movement of heavy manifold barrels. This method also prevents accidents by

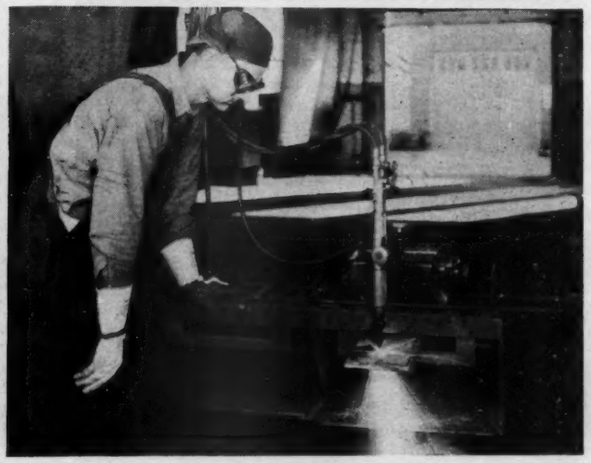


Fig. 15 (top, left)—Each oxygen cylinder is held in the rack by a metal band. Fig. 16 (bottom, left)—Electric welding machine is supported above the floor on a steel cabinet. In the cabinet welding electrodes are stored so that they are readily available. Fig. 17 (top, right)—Facilities for improving the efficiency of shop operations include work bench with steel-plate top and other features. Fig. 18 (bottom, right)—Special truck for straight-line oxyacetylene cutting machine

keeping the cables off the floor where the workmen are likely to trip and fall over them in the course of their work.

Fig. 18 shows an interior view of a portion of the shop in which the workman in the foreground is operating a straight-line oxyacetylene cutting machine. A special truck transports this machine in and around the shop during the various cutting operations. The top of the truck is equipped with cast-iron furnace grates which will withstand the intense heat of the cutting flame without serious damage. This portable cutting table has proved very efficient in fabrication work.

Efficient Work Bench

The work bench shown in the foreground of Fig. 19 is equipped with drawers and shelves for storing small hand tools. The sloping-top receptacle between the work bench and the welding rod holder is used for accumulating butt ends of welding rods instead of dropping them on the floor where they would create a hazard to the workmen. Each welder is provided with one of these receptacles. An exterior view of the shop and the steel box provided for storing junk iron, trimmings from pipe ends, scrap sheet, etc., is shown in Fig. 20. This box is equipped with a heavy bail, which permits it to be carried by the boom truck to the junk pile where the junk material is classified and disposed of. Fig. 21 shows a view of the yard back of the welding shop. The portable canvas shelter facilitates the work, especially during the hot summer months, since it permits handling heavy materials which cannot be conveniently moved inside the shop.

(k) In addition to the special tools referred to above the prnicipal equipment of the welding shop consists of:

4—300-amp. electric-driven welding machines.
1—200-amp. gasoline-driven welding machine.
3—125-amp. a.c.-d.c. vertical-type welding machines.
2—50-lb. capacity acetylene generators.
3—1-hp. flexible-shaft portable electric grinders.
1—electric-driven straight-line mechanical oxyacetylene cutting machine.
8—sets acetylene welding equipment.
1—8-in. oxyacetylene beveling machine.
1—12-in. oxyacetylene beveling machine.

In addition to the fabrication of piping systems, the welding shop is used in connection with a well-equipped machine shop for many other classes of fabrication and maintenance work required in the operation of a large pipeline system.

It is the writer's opinion that in addition to accurate designs, skilled workmanship, and careful supervision, the use of the detailed sketch (Fig. 4, The Oil and Gas Journal, July 2, 1942) has been an important factor in the success of this plan for fabricating piping systems. Therefore, the author wishes to make this special mention and enumerate its advantages below:

1. It is simple enough that the average workman can use it without interpretations from the foreman, thereby permitting the welders to proceed with fabricating parts without the customary "layout" delays.

2. It provides a quick and easy means of preparing an accurate list of materials.

3. It enables the foreman to cut nipples and sections of pipe in advance so that this class of material will be ready as needed. Likewise the other fittings for the fabrication of each member can be picked out and made available for each workman without the customary delays.

4. Through the use of code numbers, used on the master drawing and on the detailed drawings, each member can be identified as an integral part of the assembly.

5. More accurate workmanship is realized since the sketch accompanies a member through the successive operations performed in the fabrication, and is used finally for correcting misalignments due to distortion.

Use Code Numbers

6. Through the use of the code numbers its use is valuable for putting the assembly together on the location.

7. Its use has been particularly helpful in preparing shipping lists, making transfers of material and preparing records and inventories of the installed assembly.

8. For replacement of members or for redesigning an assembly already installed, the detailed sketches filed in the general offices provide a quick and accurate means of obtaining the necessary dimensions.

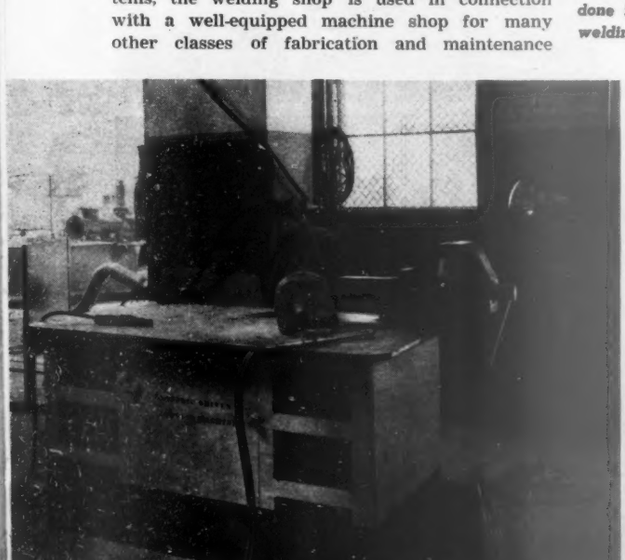
The writer also believes that on account of the rapid growth of fabrication by welding, the development of special tools and procedures has not kept pace with this new art, and that much can be accomplished in this respect to effect lower costs, facilitate and expedite work, reduce accidents, and assure greater accuracy.

In general, the best results can be obtained by fabricating the members of an assembly at a centrally located shop.

Fig. 19 (below, left)—Work bench and special equipment for welding shop

Fig. 20 (below, right)—Steel box for junk iron has heavy bail, permitting it to be moved by a boom truck

Fig. 21 (right)—Portable canvas shelter for work done in yard in back of welding shop



BOOK REVIEW

THE BEGINNINGS OF THE PETROLEUM INDUSTRY: SOURCES AND BIBLIOGRAPHY. By Dr. Paul H. Giddins. Pennsylvania Historical Commission, Harrisburg, Pa. 195 pages.

The author is professor of history at Allegheny College. In this volume he has assembled source material and bibliographies of the early history of the oil industry which were gathered by Dr. Giddens in the course of his work on "The Birth of the Oil Industry," a narrative history of petroleum beginnings which was published in 1938. Now the basic material is made available to those interested in the early history of the industry.

Refinery IDEAS ... that save $ $ $

Extensions on Valve Handles Speeds Opening

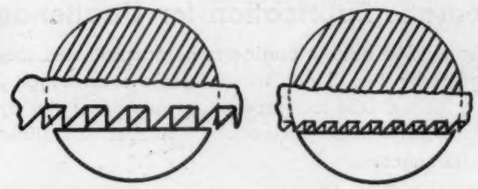
Two valves used in lines of relatively large diameter serving distillation units which must be emptied quickly to the blow-down tank in case of a fire are equipped with simple extensions to hasten their opening. On the smaller valve the operator has bolted in place a short section of rod line threaded on the two ends and fitted with sucker-rod couplings. The latter serve as handles to increase the torque when the valve is to be opened. The larger valve is similarly fitted except that due to its greater size, greater torque had to be developed through the extension and the rod used was not only allowed to extend beyond the periphery of the hand wheel but was fitted with a link and rod extension. This portion of the assembly, folds back in place on top of the valve when not in use and when opened out provides more than double the original force on the valve seat. Obviously, use of the extension places a strain on the valve seat and the extension is useful only to avoid further losses in an emergency. The extensions should be applied where valves are not used often.

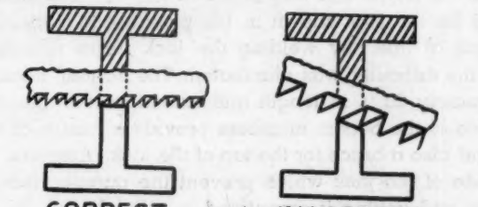
Simple Connections Allows Interior Heating of Pipes

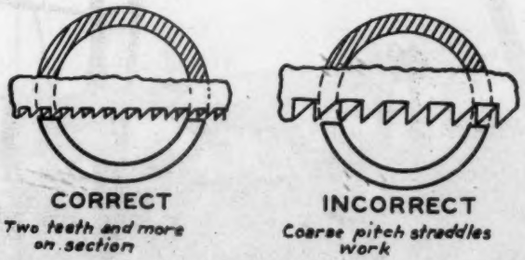
A heavy residuum or "pitch" is produced at one refinery and must be disposed of as fuel within the plant. The problem of transferring this fuel presented itself and the difficulty was especially troublesome when operating the system in cold weather. One part of the transfer was solved by inserting steam lines of small diameter inside the transfer lines and thereby keeping the residuum mobile. In the picture are shown two such lines. The inside line is made up of 2-in. pipe and carries the steam. At each turn the steam connection is made through flanges into which have been machined slip joints that permit the inside and outside pipes to expand and contract at different degrees of intensity. The flexibility of the joints is generally provided by the use of a street-ell turning inside a regular ell but where there is a long length of pipe to accommodate, the connection is usually made through two regular ells connected together by a nipple. This provides two joints instead of one.

Proper Use of Hand-Operated Hack-Saw Blades

Among the tools the mechanic and would-be mechanic uses incorrectly, the hack-saw blade probably comes in for most general abuse. The following suggestions have been used by a large refinery maintenance shop and found to be practicable. Simplified drawings have been prepared to indicate the proper and improper use of blades on three types of metal shapes commonly cut.

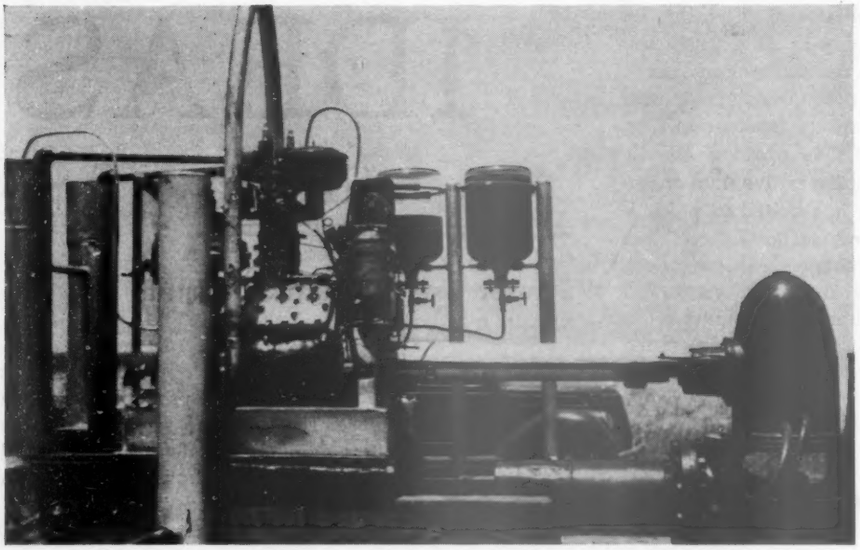






See that blade has proper tension in frame. See that holding studs in frame are not loose, causing blade to wiggle or turn. See that the object you are cutting is firmly held. Take full stroke of blade with a heavy stroke forward and slightly raising on return. Speed depends on type of material being cut—40 to 50 s.p.m. on hard material, and a maximum of 60 strokes on all other material. Use coarse-teeth blades for cutting thick material, and fine-teeth blades for thin material. At lease two teeth should be engaged to prevent breakage of the saw's teeth.

Operating Ideas

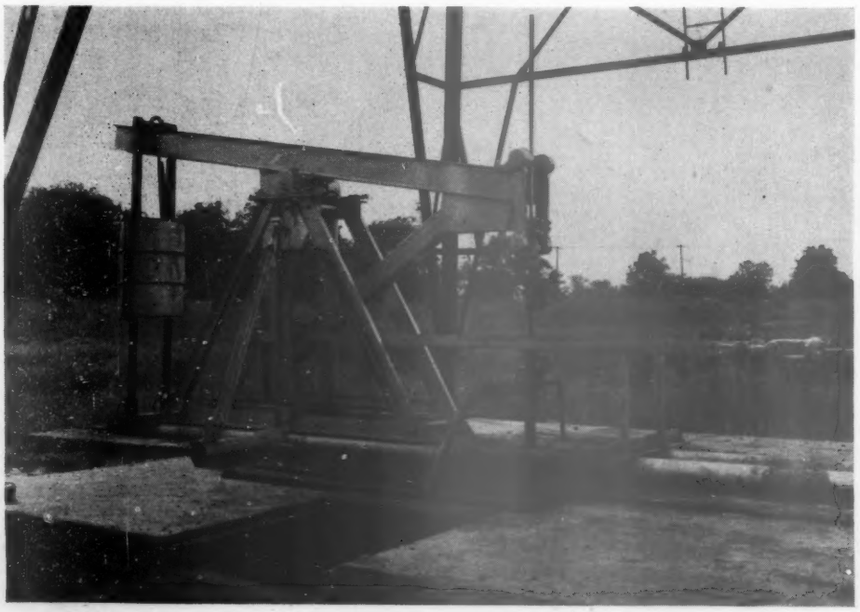


Automatic Lubrication for Unattended Butane Engine

An unattended butane engine is being protected against possible shortage of lubricating oil by two 5-gal. water bottles from which there is a constant drip of oil into the crankcase. Due to temperature change of the air in the bottles, the rate of drip varies. Storage in the crankcase, however, is sufficient to compensate for most atmospheric changes.

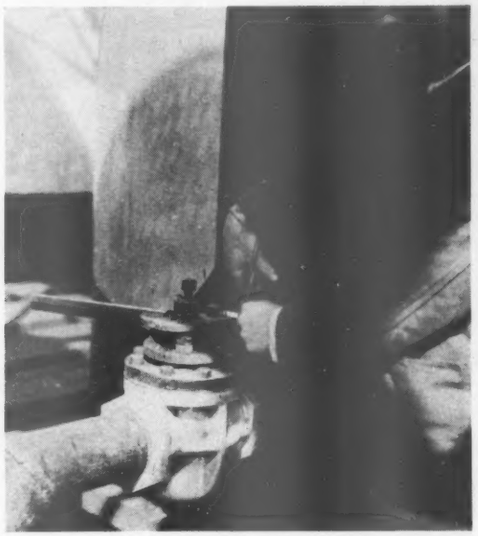
Pipe Support Holds Pumping Jack Steady

Due to the shape and size of the cellar, an adequate foundation could not be obtained for the jack shown in the picture and difficulty was experienced with its getting out of line. By welding the jack frame to a special frame made from old drill pipe, the difficulty was eliminated. The bottom members of the pipe frame are approximately 20 ft. in length and extend across the cellar opening. Projections from the side of the bottom members provide a means of bolting it down to prevent its sliding and also a brace for the top of the jack. Attention is called to the wire screens on the side of the jack which prevent the pumper from sticking an arm between the braces and getting it amputated.



Small Tin Snips Prevent Cuts

Removal of the seals from the stop cocks on a tank is necessary each time a tank of oil is run. Generally this is accomplished by simply twisting the box-car seals until they break. In performing this task in this manner, there is



always danger of the pumper cutting his hand with the sharp edge of the metal seal. One pumper requisitioned a small pair of tin snips for the job. This tool not only eliminates the danger of a cut but reduces the time necessary to remove the seal.

Cabinets for Field Records

In many cases the records kept in the field district offices are stored in open cabinets or on shelves. This allows them to collect dust and to become soiled. One district superintendent in the Texas Panhandle, where the wind and

dust are notorious, had wooden cabinets built for the filing of the necessary records. Each cabinet is equipped with special compartments for storing of the records of various sizes.

AN OLD HAND
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QUESTIONS ON TECHNOLOGY

By W. L. NELSON, Technical Editor

Recovery of Butadiene From Petroleum Products

How is butadiene recovered from a mixture of hydrocarbons by a commercial process?—R. N. R.

The separation of butadiene from the other hydrocarbons such as butane, butene, isobutane, isobutene, etc., that are normally associated with it is difficult because of the similiarity of their boiling points or vapor pressures, as:

	B.P.
Normal butane	31° F.
Butadiene	23 plus
Butene-1	21
Isobutene	20
Isobutane	13.5

In addition, the olefins (butenes) and diolefins (dienes) are chemically active materials which tend to polymerize upon heating or even standing, into high molecular weight materials somewhat comparable with rubber. The final butadiene must be kept from polymerization by the use of inhibitors.

Thus, other methods of separation such as those which involve chemical reactions or solvent extraction must be used. Little or nothing of the commercial operations involved in purifying butadiene has been published and such information probably will not be made public during the war. The following materials have been suggested as suitable solvents for the separation of butadiene and other materials (mainly isobutene):

Water (1), (6)
Aqueous ethylene chlorohydrin (1)
Aqueous ethylene glycol (1)
Aqueous glycerol (1)
Aqueous acetone (1)
Aqueous monoethanolamine and cuprous chloride (2)
Aqueous cuprous chloride (or in ammonium chloride solution) (3)
Anhydrous alcohol (4), (6)
Kerosene (5), (6)
Benzene (5)
Gasoline (6)
Turpentine (5)
Tetralin (5)
Sulfur dioxide (liquid) (9)
Maleic anhydride (8)
Aqueous borax (1)
Aqueous silver nitrate (1)
Aqueous mecuric acetate (1)

Of these, kerosene[6] is said to be troublesome because the butadiene cannot be completely recovered from the kerosene; maleic anhydride is excellent but is very expensive and would be a rare chemical from the standpoint of commercial quantities; the cuprous chloride solutions are extremely corrosive; alcohol is not an effective solvent.[4] Although gasoline, kerosene, water, alcohol, turpentine, or benzene are easily obtainable, it would seem that the solubility of butadiene in these solvents would not be greatly different from the solubility of the other hydrocarbons. The aqueous solutions would appear to hold more promise and the cuprous chloride or sulfur dioxide solutions would appear to be best.

The general operations involved in the recovery of butadiene from refinery or other gases would be somewhat as follows:

1. Absorb gases in oil.
2. Strip mixed hydrocarbons from oil.
3. Fractionate to separate a mixed butanes cut
4. Countercurrent extraction with one of the above solvents.
5. Vaporization of butadiene from the solvent (or vice versa).
6. Removal of traces of solvent from butane waste.
7. Perhaps purification of the butadiene by water wash, another solvent wash, fractionation, or other method depending upon the particular solvent.

The general chemical engineering operations of liquid-liquid extraction, desorption, stripping, washing, fractionation, etc., are already well understood, and they are being applied to butadiene manufacture.

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Butadiene From Petroleum Oils

We are told that petroleum contains very little butadiene. How much is in it and how do you get it out? —G. H. R.

Butadiene and other diolefin (diene) hydrocarbons are extremely chemically active and hence they are not found in petroleum or naturally occurring products, they would long ago have been destroyed by having reacted with other chemicals or even themselves.

Such hydrocarbons are produced by thermal decomposition or pyrolysis with or without the use of a catalyst, or by the more specific method of decomposition known as dehydrogenation. Thus, the gases produced in cracking plants contain butadiene in small amounts particularly from the vapor-phase processes which operate at extremely high temperatures, at low pressures, and in which the time of reaction is very low. The amount in cracked gases is seldom over 3 per cent[1] from the so-called liquid (mixed) phase processes, or 4 per cent from high-temperature vapor-phase cracked gases. Such yields can be increased by different operation of the cracking plants, perhaps to produce several times as much gas which may contain up to 17 per cent[2] butadiene, but it may not be advisable to change the operation of cracking plants in such a way as to suffer large losses of other useful products. Butadiene is produced in small amounts during the pyrolysis of almost any of the lighter hydrocarbons, for example, ethylene[3] and propane,[4] and the yield is increased by dilution with steam or nitrogen (or low pressures) to even 23 per cent, as with butene-2[5] or the butenes.[5 6] Perhaps the best results that have been reported are for the pyrolysis of the cyclohexane hydrocarbons[7] such as cyclohexane, cyclohexene, methylcyclohexane, and ethylcyclohexane. Yields ranging from 35 to 65 per cent expressed as mols of product per mol of feed were obtained. In connection with all of the yields mentioned, it should be realized that a yield of 10-20 per cent on a once-through operation may amount to an over-all yield of 60 plus per cent by recycling operations.

The process which is mentioned most often is the catalytic dehydrogenation of butane into butene,[8] followed by further catalytic dehydrogenation to produce butadiene.[9] It is quite probable that these two operations can be conducted in a single operation or at least as a continuous process in which it is not necessary to produce extremely pure intermediate stocks, such as butene. It is also probable that the mixed butane-butene cut from cracking-plant gases can be recycled through a single catalytic dehydrogenation operation. The yields by each of the hydrogenation operations is between 70 and 80 per cent and hence the final yield of butadiene exceeds 50 per cent and probably will be definitely higher.

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Separation of Propane From Propene

Can you relate to me a method or the reference to a method whereby the amount of propene in a mixture of propane and propene may be determined by chemical means?—G. P. H.

The classical methods of determining the amount of olefin gases in mixtures have been absorption in saturated bromine water or in concentrated sulfuric acid. These methods are still good, and they are described well in U.O.P. Method G-84-40 which appears in U.O.P. Laboratory Test Methods for Petroleum and Its Products, published by Universal Oil Products Co., 310 South Michigan Avenue, Chicago, Ill.

The general scheme of analysis for olefins in the presence of paraffin hydrocarbons is as follows:

1. Low-temperature fractional analysis (U.O.P. Method G-59-40) separating into 2, 3, 4, and 5 carbon atom fractions.
2. Absorption of ethylene into saturated bromine water.
3. Absorption of propene into saturated bromine water.
4. Absorption of isobutene into 67 per cent sulfuric acid.
5. Absorption of normal butene into 84 per cent sulfuric acid.

CO$T Engineering

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL

UNIT OPERATION

AUGUST 6, 1942

CONSOLIDATION AND UNITIZATION SAVE HUGE SUMS FOR OPERATORS

PRACTICALLY all oil-producing pools in the country are owned by several operators, although there are some exceptions, and there are other cases where large portions of a single field are owned and operated by one major company. There is also a small number of pools which have been unitized principally for the purpose of obtaining more positive control of the reservoir and increasing the recovery thereby.

In the past few years, and greatly accelerated during the past few months, there has been a tendency to trade leases for the purpose of consolidation and unitization. The recent impetus was due to a threatened shortage of manpower and particularly to a shortage of tires. This may or may not lead into a general revision and trading of properties with a view to reducing the operating costs.

There are several types of arrangements which can be made for the duration of the war or they can be set up permanently. One of these consists of swapping leases and properties within a field so that each company has its operations centralized. Thus, instead of Company A operating 10 leases of 80 acres each scattered in all corners of the field, there is a general reshuffling, and this company, like each of the others operating in the pool, manages a block in one section of the pool. This requires a great deal of trading as the reserves and the value of the physical assets must be determined and the trading carried out on that basis. The net effect is a substantial reduction in operating costs and in the transportation and supervision charges.

A simpler type of trade is shown in the drawing. Company X and Company Y each operate leases of approximate size in pools A and B. Each company maintains a complete organization with a superintendent, pumpers, lease workers and office force. By trading leases, Company X takes over the properties of both companies in pool A and Company Y takes over the properties in pool B with the result that each reduces its actual expenses considerably.

A third plan is the complete unitization of all the properties of the field so they are operated by either one company or a committee of representatives of all companies. The difficulty here is satisfying all the interests involved. In any one pool where there is a great diversity of ownership, there is always considerable variation of opinion, particularly where the value of the properties is concerned. Such a plan does, however, offer the greatest savings and it also offers the greatest opportunity of pool management so as to obtain the greatest recovery of the oil.

A fourth plan is for one company to take over all the leases in the field and operate them on a cost basis. The one company produces the wells, services them, accounts for the business to the various owners and charges them for the cost of operation.

From the following table, some idea of the savings to be gained from consolidation may be obtained.

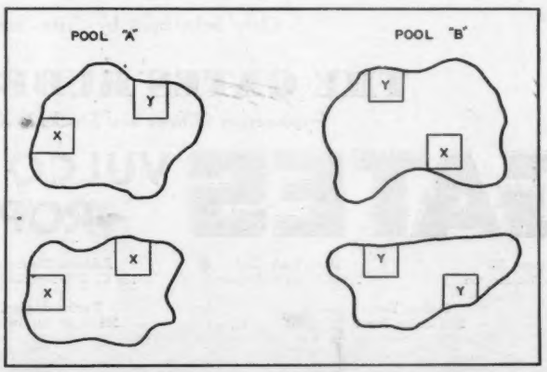
COST PER BARREL OF PRODUCING OIL

Superintendence	$0.007
Labor	0.079
Repairs and maintenance	0.027
Fuel and power	0.019
Tools and supplies	0.008
Cleanout and repair	0.007
Treating	0.005
Insurance	0.004
Taxes	0.063
Trucking	0.006
Miscellaneous	0.032
Total	0.257

Any type of consolidation would affect the charges for superintendence, labor, repairs and maintenance, cleanout and repair, treating and trucking. These items constitute over half of the lifting costs and a 50 per cent reduction in them would result in reducing the costs to less than 20 cents per barrel of oil lifted. Thus in the case illustrated in the drawing, each company would cut its charge for superintendence to 0.0035 cent per barrel and would cut its labor to approximately 0.052 cent. The other items would show similar reductions.

Principal difficulty is the determination of the value of each property. The larger companies have technical staffs to handle this type work and they are expert in estimating crude reserves, the value of the physical equipment and its salvage value. Smaller companies may have one or two men doing this work and the very small companies must employ a consultant.

There is a natural tendency for the company vending the property to place a slightly high value on it. If two companies making a trade have both overvaluated equally, no harm is done as an agreement can be reached. Sight should never be lost of the main objective, the saving through consolidation. A reduction of 5 cents per barrel in lifting costs on 75,000 bbl. of oil annually will permit the trader to lose 10,000 bbl. in crude-oil reserves and still make money on the deal. He can afford to go ahead on the deal even though he feels he is not getting a particular bargain, always keeping in mind that the other party may feel he also is losing a little but gaining more in the transaction.



DEVOTED TO COST ESTIMATIONS, OPERATING CALCULATIONS AND PROFIT MAKING

What Happens When a V-Belt Bends

FIG. 1

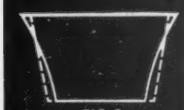


FIG. 2

Here is Simple PROOF *of a* REAL SAVING in BELTS, in RUBBER, in POWER

In two minutes you can prove for yourself a simple fact that will lengthen belt wear and reduce operating costs.

Pick up any V-belt. Bend it as it bends when it goes around its pulley. As the belt bends, grip the sidewalls with your fingers. You will feel the *sides* of the belt *change shape.* If the belt has *straight* sides, the bending will force those sides to bulge out—as shown in Figure 1 (on the left).

Now make this same test with a belt that is built with the patented Concave side. Again you will feel the sides change shape but with this *important difference:*—the Concave side becomes perfectly straight. This belt, when bent, takes a shape that exactly fits its sheave groove. (See Figure 2).

Here are the savings. First—no out-bulge of the sides means uniform sidewall wear—a saving in belts for you, a saving in rubber for the Nation. Second—the full side of the belt uniformly grips the sheave wall. This means heavier loads without slippage—a saving in belt wear and also in power!

Only belts built by Gates are built with the Concave side, a Gates patent.

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CO$T Engineering

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL

AUGUST 6, 1942

ACCURATE RESERVE ESTIMATES

CRUDE-OIL reserve estimates are of two types, general and specific. The former are compiled by The Oil and Gas Journal and various organizations and associations. They show the general picture as to the crude-oil resources of the nation from which logical estimates of production may be made. In this case the law of compensating errors holds true as the estimator, being a neutral observer, will underestimate as many fields as he will overestimate.

The specific reserves are figured by engineers or operating men for each company on the individual leases and by groups of engineers representing the companies interested for the individual pools. Here the law of compensating errors does not hold true as there is a natural tendency to glorify an object which has a personal connection. Through the compilation of the reports on the individual leases and pools, each company has a picture of its trade stock and can estimate its capital, can measure its stock in terms of accumulation and liquidation and can determine how long it can maintain operations. The accounting and tax departments must take the reserve estimates as a basis for depletion and depreciation. It is the savings in this direction which will pay the cost of maintaining a department, or the requisite number of men, to figure the reserves as accurately as possible.

Unfortunately, there is as yet no method of positively determining the reserves of a particular lease, with the exception of producing the property to abandonment. However, there are several methods by which the reserve can be estimated more or less accurately and the more checking of the figures, the better they will be. With the original saturation, sand thickness, reservoir pressure, and the monthly production and bottom-hole-pressure record, the geologist and engineer can arrive at a close estimate. Having the estimates made by some department, such as accounting or tax, which does not have access to the original data on the lease, can only lead to losses.

A specific example will illustrate the result of simply assuming a certain amount of reserve crude oil under a lease. Consider a property as having been developed in June and at the year's end, according to federal and state requirements, the reserve on the property is arbitrarily set at 800,000 bbl. The operating company then determines the cost of the physical equipment, etc., and divides that cost on a per well basis for the 700,000 bbl. net remaining. The property may be of the type which affords rapid withdrawal and is produced at capacity rates. Field engineers and technicians may be aware that the production is of short duration, or that high water production may cause an early abandonment, but this knowledge is not passed on.

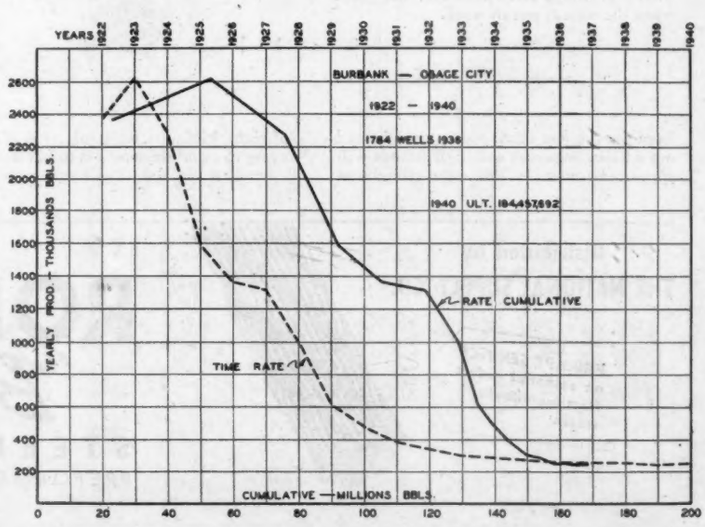
A year and a half passes since the development of the lease and again taxes are paid on the original estimates. In the meantime, 400,000 bbl. of the oil has been produced and the field has reached its economic limit. The accounting department now finds that it has depleted and depreciated only 50 per cent of the original cost and the remaining 50 per cent must be regarded as a direct loss since regulations do not permit referring the new depletion and depreciation rates back to the previous years.

Admittedly, this is an exaggerated case and the potential loss would be headed off because the sum involved would attract attention. However, it has happened. A number of minor cases would pass unnoticed and in the aggregate would amount to more than the single loss described above.

It is sometimes difficult for the layman to distinguish between book loss and out-of-pocket loss and yet the former is important although it may not be reflected in actual money at the time shown on the books.

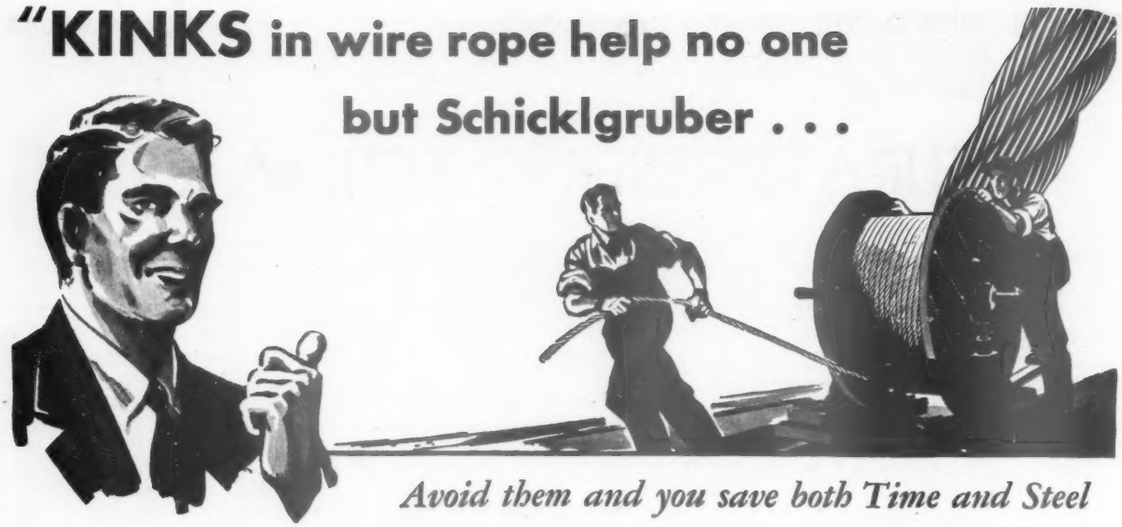
A stock company pays annually a percentage of the net profit to the stockholders and the remaining net profit is the capital which must be reinvested in crude-oil reserves for the company to maintain operations. If through error in the reserve estimates, insufficient funds are set aside for depletion and depreciation, the company is actually paying dividends out of its capital rather than its income. Over a period of years, this removal of capital would reach major proportions. During the growing-up years of the oil industry, the margin of profit has been large enough to generally overshadow this type of loss. As the margin narrows, this item becomes more important.

Accurate reserve figures are of considerable value in other ways than controlling depletion and depreciation. Farmout proposals and edge-lease drilling can be better evaluated on a reserve-cost basis than on the haphazard methods often employed. Occasionally on wildcat wells the productivity of a formation can be estimated accurately enough to decide the profitableness of setting casing and producing the well.



DEVOTED TO COST ESTIMATIONS, OPERATING CALCULATIONS AND PROFIT MAKING

"KINKS in wire rope help no one but Schicklgruber . . .



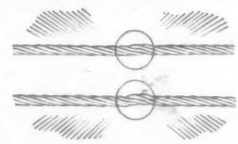
Avoid them and you save both Time and Steel

To the experienced wire rope user it may sound trite to say wire rope is a costly machine and must be treated as such. But there may be young fellows under you handling Roebling rope today who haven't learned by experience, and it's up to you to see that nothing they do will waste the valuable time and rope steel so vitally needed. Unloading the reel is just one way that a beginner may damage a rope. So tell him first that a reel of rope, like a motor or other piece of valuable equipment, should be handled carefully and not dropped from a truck or platform. Nor should it ever be moved by *prying against* the coiled rope.

But it's in kinking that the most serious damage is likely to occur. A kink starts as a loop like this!

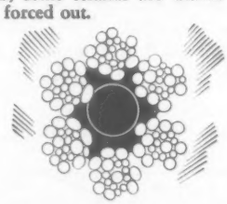
If it gets pulled tight, the damage has been done. The uniform relative position of the strands and wires has been disturbed—causing unequal stress distribution and abrasive wear that brings early failure at this point when the rope is put to work.

Even though you think you've straightened out a kink, looseness and high strands will appear. Because as the rope straightens after kinking, an extra twist is thrown into the strands that can never be removed. Here's a kinked rope under 10,000 pounds tension, and below it the same rope after the tension had been relieved . . .



But notice that the kink remains. That means very severe abrasive wear on the high strands and abusive strain on the drawn strands since they carry more than their share of the load. To show you what happens to the drawn strands inside the rope, here is one cut through at the kinked section.

Notice how the hemp center is compressed; some strands are drawn in and others forced out.



All right, kinks are wasteful . . . but it's just as easy to avoid them as it is to put them in. Remember, kinks start as loops—caused in most cases by taking rope from a stationary reel or coil. *The remedy is simple*—always unwind wire rope straight ahead by rotating the reel or coil. Don't let the reel get going faster than your rope is coming off. Always keep some tension on the rope if at all possible. Most people put a shaft through the center of the reel and jack it up—as shown in the big illustration at top. If it's in a coil, simply roll it along the floor like this . . .

It's as easy as that to avoid kinking during installation (where most kinks occur). Have these rules followed by every man who handles it, and you'll be on the way to getting all the *extra* service that's built into every inch of wire rope that bears the Roebling trademark."

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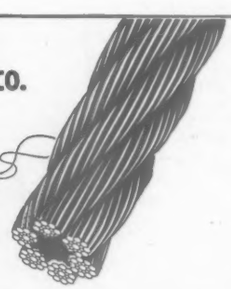

ROEBLING
"Blue Center"
STEEL WIRE ROPE
PREFORMED OR NON-PREFORMED

Engineering Fundamentals

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL No. 31

AUGUST 6, 1942

PROPERTIES OF SATURATED STEAM

TABLE 1—SATURATED STEAM: TEMPERATURE TABLE

Temp., °F.	Abs. pres., Lb. per sq. in.	Specific volume			Enthalpy			Entropy		
		Sat. liquid	Evap.	Sat. vapor	Sat. liquid	Evap.	Sat. vapor	Sat. liquid	Evap.	Sat. vapor
32	0.0886	0.01602	3305.7	3305.7	0	1075.1	1075.1	0	2.1865	2.1865
34	0.0961	0.01602	3060.4	3060.4	2.01	1074.0	1076.0	0.0041	2.1755	2.1796
36	0.1041	0.01602	2836.6	2836.6	4.03	1072.9	1076.9	0.0082	2.1645	2.1727
38	0.1126	0.01602	2632.2	2632.2	6.04	1071.7	1077.7	0.0122	2.1533	2.1655
40	0.1217	0.01602	2445.1	2445.1	8.05	1070.5	1078.6	0.0162	2.1423	2.1585
42	0.1315	0.01602	2271.8	2271.8	10.06	1069.3	1079.4	0.0203	2.1314	2.1517
44	0.1420	0.01602	2112.2	2112.2	12.06	1068.2	1080.3	0.0242	2.1207	2.1449
46	0.1532	0.01602	1965.5	1965.5	14.07	1067.1	1081.2	0.0282	2.1102	2.1384
48	0.1652	0.01602	1829.9	1829.9	16.07	1065.9	1082.0	0.0322	2.0995	2.1317
50	0.1780	0.01602	1704.9	1704.9	18.07	1064.8	1082.9	0.0361	2.0891	2.1252
52	0.1918	0.01603	1588.4	1588.4	20.07	1063.6	1083.7	0.0400	2.0786	2.1186
54	0.2063	0.01603	1482.4	1482.4	22.07	1062.5	1084.6	0.0439	2.0684	2.1123
56	0.2219	0.01603	1383.5	1383.5	24.07	1061.4	1085.5	0.0478	2.0582	2.1060
58	0.2384	0.01603	1292.7	1292.7	26.07	1060.2	1086.3	0.0517	2.0479	2.0996
60	0.2561	0.01603	1208.1	1208.1	28.07	1059.1	1087.2	0.0555	2.0379	2.0934
62	0.2749	0.01604	1129.7	1129.7	30.06	1057.9	1088.0	0.0594	2.0278	2.0872
64	0.2949	0.01604	1057.1	1057.1	32.06	1056.8	1088.9	0.0632	2.0180	2.0812
66	0.3162	0.01604	989.6	989.6	34.06	1055.7	10.898	0.0670	2.0082	2.0752
68	0.3388	0.01605	927.0	927.0	36.05	1054.5	1090.6	0.0708	1.9983	2.0691
70	0.3628	0.01605	868.9	868.9	38.05	1053.4	1091.5	0.0745	1.9887	2.0632
72	0.3883	0.01606	814.9	814.9	40.04	1052.3	1092.3	0.0783	1.9792	2.0575
74	0.4153	0.01606	764.7	764.7	42.04	1051.2	1093.2	0.0820	1.9697	2.0517
76	0.4440	0.01607	718.0	718.0	44.03	1050.1	1094.1	0.0858	1.9603	2.0461
78	0.4744	0.01607	674.4	674.4	46.03	1048.9	1094.9	0.0895	1.9508	2.0403
80	0.5067	0.01607	633.7	633.7	48.02	1047.8	1095.8	0.0932	1.9415	2.0347
82	0.5409	0.01608	595.8	595.8	50.02	1046.6	1096.6	0.0969	1.9321	2.0290
84	0.5772	0.01608	560.4	560.4	52.01	1045.5	1097.5	0.1006	1.9230	2.0236
86	0.6153	0.01609	527.6	527.6	54.01	1044.4	1098.4	0.1042	1.9139	2.0181
88	0.6555	0.01609	497.0	497.0	56.00	1043.2	1099.2	0.1079	1.9047	2.0126
90	0.6980	0.01610	468.4	468.4	58.00	1042.1	1100.1	0.1115	1.8958	2.0073
92	0.7429	0.01611	441.7	441.7	59.99	1040.9	1100.9	0.1151	1.8867	2.0018
94	0.7902	0.01611	416.7	416.7	61.98	1039.8	1101.8	0.1187	1.8779	1.9966
96	0.8403	0.01612	393.2	393.2	63.98	1038.7	1102.7	0.1223	1.8692	1.9915
98	0.8930	0.01613	371.3	371.3	65.98	1037.5	1103.5	0.1259	1.8604	1.9863
100	0.9847	0.01613	350.8	350.8	67.97	1036.4	1104.4	0.1295	1.8517	1.9812
102	1.0072	0.01614	331.5	331.5	69.96	1035.2	1105.2	0.1330	1.8430	1.9760
104	1.0689	0.01614	313.5	313.5	71.96	1034.1	1106.1	0.1366	1.8345	1.9711
106	1.1338	0.01615	296.5	296.5	73.95	1033.0	1107.0	0.1401	1.8261	1.9662
108	1.2020	0.01616	280.7	280.7	75.94	1032.0	1107.9	0.1436	1.8179	1.9615
110	1.274	0.01617	265.7	265.7	77.94	1030.9	1108.8	0.1471	1.8096	1.9567
112	1.350	0.01617	251.6	251.6	79.93	1029.7	1109.6	0.1506	1.8012	1.9518
114	1.429	0.01618	238.5	238.5	81.93	1028.6	1110.5	0.1541	1.7930	1.9471
116	1.512	0.01619	226.2	226.2	83.92	1027.5	1111.4	0.1576	1.7848	1.9424
118	1.600	0.01620	214.5	214.5	85.92	1026.4	1112.3	0.1610	1.7767	1.9377
120	1.692	0.01620	203.45	203.47	87.91	1025.3	1113.2	0.1645	1.7687	1.9332
122	1.788	0.01621	193.16	193.18	89.91	1024.1	1114.0	0.1679	1.7606	1.9285
124	1.889	0.01622	183.44	183.46	91.90	1023.0	1114.9	0.1714	1.7526	1.9240
126	1.995	0.01623	174.26	174.28	93.90	1021.8	1115.7	0.1748	1.7446	1.9194
128	2.105	0.01624	165.70	165.72	95.90	1020.7	1116.6	0.1782	1.7368	1.9150
130	2.221	0.01625	157.55	157.57	97.89	1019.5	1117.4	0.1816	1.7289	1.9105
132	2.343	0.01626	149.83	149.85	99.89	1018.3	1118.2	0.1849	1.7210	1.9059
134	2.470	0.01626	142.59	142.61	101.89	1017.2	1119.1	0.1883	1.7134	1.9017
136	2.603	0.01627	135.73	135.75	103.88	1016.0	1119.9	0.1917	1.7056	1.8973
138	2.742	0.01628	129.26	129.28	105.88	1014.9	1120.8	0.1950	1.6980	1.8930
140	2.887	0.01629	123.16	123.18	107.88	1013.7	1121.6	0.1984	1.6904	1.8888
142	3.039	0.01630	117.37	117.39	109.88	1012.5	1122.4	0.2017	1.6828	1.8845
144	3.198	0.01631	111.88	111.90	111.88	1011.3	1123.2	0.2050	1.6752	1.8802
146	3.363	0.01632	106.72	106.74	113.88	1010.2	1124.1	0.2083	1.6678	1.8761
148	3.536	0.01633	101.82	101.84	115.87	1009.0	1124.9	0.2116	1.6604	1.8720
150	3.716	0.01634	97.18	97.20	117.87	1007.8	1125.7	0.2149	1.6530	1.8679
152	3.904	0.01635	92.79	92.81	119.87	1006.7	1126.6	0.2181	1.6458	1.8639
154	4.100	0.01636	88.62	88.64	121.87	1005.5	1127.4	0.2214	1.6384	1.8598
156	4.305	0.01637	84.66	84.68	123.87	1004.4	1128.3	0.2247	1.6313	1.8560
158	4.518	0.01638	80.90	80.92	125.87	1003.2	1129.1	0.2279	1.6241	1.8520
160	4.739	0.01639	77.37	77.39	127.87	1002.0	1129.9	0.2311	1.6169	1.8480
162	4.970	0.01640	74.00	74.02	129.88	1000.8	1130.7	0.2343	1.6098	1.8441
164	5.210	0.01642	70.79	70.81	131.88	999.7	1131.6	0.2376	1.6029	1.8405
166	5.460	0.01643	67.76	67.78	133.88	998.5	1132.4	0.2408	1.5958	1.8366
168	5.720	0.01644	64.87	64.89	135.88	997.3	1133.2	0.2439	1.5888	1.8327
170	5.990	0.01645	62.12	62.14	137.89	996.1	1134.0	0.2471	1.5819	1.8290
172	6.272	0.01646	59.50	59.52	139.89	995.0	1134.9	0.2503	1.5751	1.8254
174	6.565	0.01647	57.01	57.03	141.89	993.8	1135.7	0.2535	1.5683	1.8218
176	6.869	0.01648	54.64	54.66	143.90	992.6	1136.5	0.2566	1.5615	1.8181
178	7.184	0.01650	52.39	52.41	145.90	991.4	1137.3	0.2598	1.5547	1.8145
180	7.510	0.01651	50.26	50.28	147.91	990.2	1138.1	0.2629	1.5479	1.8108
182	7.849	0.01652	48.22	48.24	149.92	989.0	1138.9	0.2661	1.5412	1.8073
184	8.201	0.01653	46.28	46.30	151.92	987.8	1139.7	0.2692	1.5346	1.8038
186	8.566	0.01654	44.43	44.45	153.93	986.6	1140.5	0.2723	1.5280	1.8003
188	8.944	0.01656	42.67	42.69	155.94	985.3	1141.3	0.2754	1.5213	1.7967
190	9.336	0.01657	40.99	41.01	157.95	984.1	1142.1	0.2785	1.5147	1.7932
192	9.744	0.01658	39.38	39.40	159.95	982.8	1142.8	0.2816	1.5081	1.7897
194	10.168	0.01659	37.84	37.86	161.96	981.5	1143.5	0.2847	1.5015	1.7862
196	10.605	0.01661	36.38	36.40	163.97	980.3	1144.3	0.2877	1.4951	1.7828
198	11.057	0.01662	34.98	35.00	165.98	979.0	1145.0	0.2908	1.4885	1.7793
200	11.525	0.01663	33.65	33.67	167.99	977.8	1145.8	0.2938	1.4822	1.7760
202	12.010	0.01665	32.37	32.39	170.01	976.6	1146.6	0.2969	1.4759	1.7728
204	12.512	0.01666	31.15	31.17	172.02	975.3	1147.3	0.2999	1.4695	1.7694
206	13.031	0.01667	29.99	30.01	174.03	974.1	1148.1	0.3029	1.4633	1.7662
208	13.568	0.01669	28.88	28.90	176.04	972.8	1148.8	0.3059	1.4570	1.7629
210	14.123	0.01670	27.81	27.83	178.06	971.5	1149.6	0.3090	1.4507	1.7597

(Continued on next page)

Series prepared by Glenn M. Stearns, associate professor of petroleum engineering, University of Oklahoma

Engineering Fundamentals

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL

AUGUST 6, 1942

PROPERTIES OF SATURATED STEAM (Continued)

Temp., °F.	Abs. pres., Lb. per sq. in.	Specific volume: Sat. liquid	Specific volume: Evap.	Specific volume: Sat. vapor	Enthalpy: Sat. liquid	Enthalpy: Evap.	Enthalpy: Sat. vapor	Entropy: Sat. liquid	Entropy: Evap.	Entropy: Sat. vapor
212	14.696	0.01672	26.81	26.83	180.07	970.3	1150.4	0.3120	1.4446	1.7566
215	15.591	0.01674	25.35	25.37	183.10	968.3	1151.4	0.3165	1.4352	1.7517
220	17.188	0.01677	23.14	23.16	188.14	965.2	1153.3	0.3239	1.4201	1.7440
225	18.915	0.01681	21.15	21.17	193.18	961.9	1155.1	0.3313	1.4049	1.7362
230	20.78	0.01684	19.371	19.388	198.22	958.7	1156.9	0.3386	1.3900	1.7286
235	22.80	0.01688	17.761	17.778	203.28	955.3	1158.6	0.3459	1.3751	1.7210
240	24.97	0.01692	16.307	16.324	208.34	952.1	1160.4	0.3531	1.3607	1.7138
245	27.31	0.01696	15.010	15.027	213.41	948.7	1162.1	0.3604	1.3462	1.7066
250	29.82	0.01700	13.824	13.841	218.48	945.3	1163.8	0.3675	1.3320	1.6995
255	32.53	0.01704	12.735	12.752	223.56	942.0	1165.6	0.3747	1.3181	1.6928
260	35.43	0.01708	11.754	11.771	228.65	938.6	1167.3	0.3817	1.3042	1.6859
265	38.54	0.01713	10.861	10.878	233.74	935.3	1169.0	0.3888	1.2906	1.6794
270	41.85	0.01717	10.053	10.070	238.84	931.8	1170.6	0.3958	1.2770	1.6728
275	45.40	0.01721	9.313	9.330	243.94	928.2	1172.1	0.4027	1.2634	1.6661
280	49.20	0.01726	8.634	8.651	249.06	924.6	1173.7	0.4096	1.2500	1.6596
285	53.25	0.01731	8.015	8.032	254.18	921.0	1175.2	0.4165	1.2368	1.6533
290	57.55	0.01735	7.448	7.465	259.31	917.4	1176.7	0.4234	1.2237	1.6471
295	62.13	0.01740	6.931	6.948	264.45	913.7	1178.2	0.4302	1.2107	1.6409
300	67.01	0.01745	6.454	6.471	269.60	910.1	1179.7	0.4370	1.1980	1.6350
305	72.18	0.01750	6.014	6.032	274.76	906.3	1181.1	0.4437	1.1852	1.6289
310	77.68	0.01755	5.610	5.628	279.92	902.6	1182.5	0.4505	1.1727	1.6232
315	83.50	0.01760	5.239	5.257	285.10	898.8	1183.9	0.4571	1.1587	1.6158
320	89.65	0.01765	4.897	4.915	290.29	895.0	1185.3	0.4637	1.1479	1.6116
325	96.16	0.01771	4.583	4.601	295.49	891.1	1186.6	0.4703	1.1356	1.6059
330	103.03	0.01776	4.292	4.310	300.69	887.1	1187.8	0.4769	1.1234	1.6003
335	110.31	0.01782	4.021	4.039	305.91	883.2	1189.1	0.4835	1.1114	1.5949
340	117.99	0.01788	3.771	3.789	311.14	879.2	1190.3	0.4900	1.0994	1.5894
345	126.10	0.01793	3.539	3.557	316.38	875.1	1191.5	0.4966	1.0875	1.5841
350	134.62	0.01799	3.324	3.342	321.64	871.0	1192.6	0.5030	1.0757	1.5787
355	143.58	0.01805	3.126	3.144	326.91	866.8	1193.7	0.5094	1.0640	1.5734
360	153.01	0.01811	2.940	2.958	332.19	862.5	1194.7	0.5159	1.0522	1.5681
365	162.93	0.01817	2.768	2.786	337.48	858.2	1195.7	0.5223	1.0406	1.5629
370	173.33	0.01823	2.607	2.625	342.79	853.8	1196.6	0.5286	1.0291	1.5577
375	184.23	0.01830	2.458	2.476	348.11	849.4	1197.5	0.5350	1.0176	1.5526
380	195.70	0.01836	2.318	2.336	353.45	844.9	1198.4	0.5413	1.0062	1.5475
385	207.71	0.01843	2.189	2.207	358.80	840.4	1199.2	0.5476	0.9949	1.5425
390	220.29	0.01850	2.064	2.083	364.17	835.7	1199.9	0.5540	0.9835	1.5375
395	233.47	0.01857	1.9512	1.9698	369.56	831.0	1200.6	0.5602	0.9723	1.5325
400	247.25	0.01864	1.8446	1.8632	374.97	826.2	1201.2	0.5664	0.9610	1.5274
405	261.67	0.01871	1.7445	1.7632	380.40	821.4	1201.8	0.5727	0.9499	1.5226
410	276.72	0.01878	1.6508	1.6696	385.83	816.6	1202.4	0.5789	0.9390	1.5179
415	292.44	0.01886	1.5630	1.5819	391.30	811.7	1203.0	0.5851	0.9280	1.5131
420	308.82	0.01894	1.4806	1.4995	396.78	806.7	1203.5	0.5912	0.9170	1.5082
425	325.91	0.01902	1.4031	1.4221	402.28	801.6	1203.9	0.5974	0.9061	1.5035
430	343.71	0.01910	1.3303	1.3494	407.80	796.5	1204.3	0.6036	0.8953	1.4989
435	362.27	0.01918	1.2617	1.2809	413.35	791.2	1204.6	0.6097	0.8843	1.4940
440	381.59	0.01926	1.1973	1.2166	418.91	785.9	1204.8	0.6159	0.8735	1.4894
445	401.70	0.01934	1.1367	1.1560	424.49	780.4	1204.9	0.6220	0.8626	1.4846
450	422.61	0.01943	1.0796	1.0990	430.11	774.9	1205.0	0.6281	0.8518	1.4799

TABLE 2—SATURATED STEAM: PRESSURE TABLE

Abs. pres. lb./sq. in.	Temp., °F.	Specific volume: Sat. liquid	Specific volume: Evap.	Specific volume: Sat. vapor	Enthalpy: Sat. liquid	Enthalpy: Evap.	Enthalpy: Sat. vapor	Entropy: Sat. liquid	Entropy: Evap.	Entropy: Sat. vapor
0.0886	32.00	0.01602	3305.7	3305.7	0	1075.1	1075.1	0	2.1865	2.1865
1	101.76	0.01614	333.77	333.79	69.72	1035.5	1105.2	0.1326	1.8443	1.9769
5	162.25	0.01641	73.584	73.600	130.13	1000.7	1130.8	0.2347	1.6090	1.8437
10	193.21	0.01659	38.445	38.462	161.17	982.1	1143.3	0.2834	1.5042	1.7876
14.696	212.00	0.01672	26.811	26.828	180.07	970.3	1150.4	0.3120	1.4446	1.7566
20	227.96	0.01683	20.093	20.110	196.16	959.9	1156.1	0.3356	1.3959	1.7315
30	250.34	0.01700	13.746	13.763	218.83	945.2	1164.0	0.3680	1.3312	1.6992
40	267.24	0.01715	10.489	10.506	236.02	933.7	1169.7	0.3919	1.2844	1.6763
50	281.01	0.01727	8.505	8.522	250.09	923.9	1174.0	0.4110	1.2473	1.6583
60	292.71	0.01738	7.162	7.179	262.10	915.4	1177.5	0.4271	1.2166	1.6437
70	302.92	0.01748	6.193	6.210	272.61	907.9	1180.5	0.4409	1.1905	1.6314
80	312.03	0.01757	5.458	5.476	282.02	901.1	1183.1	0.4532	1.1677	1.6209
90	320.27	0.01766	4.880	4.898	290.57	894.8	1185.4	0.4641	1.1472	1.6113
100	327.83	0.01774	4.415	4.433	298.43	888.9	1187.3	0.4741	1.1287	1.6028
110	334.79	0.01782	4.032	4.050	305.69	883.3	1189.0	0.4832	1.1118	1.5950
120	341.26	0.01789	3.710	3.728	312.46	878.1	1190.6	0.4916	1.0963	1.5879
130	347.31	0.01796	3.437	3.455	318.81	873.2	1192.0	0.4995	1.0820	1.5815
140	353.03	0.01803	3.202	3.220	324.83	868.5	1193.3	0.5069	1.0686	1.5755
150	358.43	0.01809	2.998	3.016	330.53	863.9	1194.4	0.5138	1.0560	1.5698
160	363.55	0.01815	2.816	2.834	335.95	859.6	1195.5	0.5204	1.0442	1.5646
170	368.42	0.01821	2.656	2.674	341.11	855.2	1196.3	0.5266	1.0327	1.5593
180	373.08	0.01827	2.514	2.532	346.07	851.1	1197.2	0.5325	1.0220	1.5545
190	377.55	0.01833	2.386	2.404	350.83	847.2	1198.0	0.5382	1.0119	1.5501
200	381.82	0.01839	2.270	2.288	355.40	843.3	1198.7	0.5436	1.0021	1.5457
210	385.93	0.01844	2.165	2.183	359.80	889.6	1199.4	0.5488	0.9929	1.5417
220	389.89	0.01850	2.067	2.086	364.05	835.8	1199.9	0.5538	0.9838	1.5376
230	393.70	0.01855	1.9803	1.9989	368.16	832.2	1200.4	0.5585	0.9752	1.5337
240	397.40	0.01860	1.8990	1.9176	372.16	828.7	1200.9	0.5632	0.9669	1.5301
250	400.97	0.01866	1.8244	1.8431	376.04	825.4	1201.4	0.5677	0.9590	1.5267
260	404.43	0.01870	1.7555	1.7742	379.78	822.0	1201.8	0.5720	0.9513	1.5233
270	407.79	0.01875	1.6913	1.7101	383.43	818.8	1202.2	0.5761	0.9439	1.5200
280	411.06	0.01880	1.6316	1.6504	386.99	815.5	1202.5	0.5802	0.9365	1.5167
290	414.24	0.01885	1.5758	1.5947	390.47	812.4	1202.9	0.5841	0.9296	1.5137
300	417.33	0.01890	1.5237	1.5426	393.85	809.3	1203.2	0.5879	0.9228	1.5107
350	431.71	0.01912	1.3064	1.3255	409.70	794.7	1204.4	0.6057	0.8915	1.4972
400	444.58	0.0193	1.1416	1.1609	424.02	780.9	1204.9	0.6215	0.8635	1.4850
450	456.27	0.0195	1.0123	1.0318	437.18	767.8	1205.0	0.6357	0.8382	1.4739

These tables reproduced from Steam Tables: Properties of Saturated and Superheated Steam, Combustion Engineering Co., Inc., 200 Madison Avenue, New York, N. Y.

Series prepared by Glenn M. Stearns, associate professor of petroleum engineering, University of Oklahoma

Modified Coupling Ties Lines Of Different Sizes Together

RECENTLY in a refinery it was necessary to tie two gasoline, trunk-line manifolds into a new tank. Rather than fill the lines with water to drive out water and gas so that these tie-ins could be welded into the lines, a modified Dresser connection was devised.

In this case, a 6-in. and a 3-in. swage connection was needed. Two Dresser couplings were dismantled and the sleeves cut in half. A short piece of 8-in. pipe was swaged to the 6-in. sleeve in each end and a 6-in. welding flange was centered on the 8-in. making a T-fitting. The bolts that came with the coupling were of course too short to reach the entire length of the new coupling, and one of the bolts could not run all the way from end to end because of the welding-neck flange. To take care of this situation, three of the bolts were cut in half and short pieces welded in so as to obtain the proper length. In order to provide for the flange, it was found that by welding the halved bolt to each side of the flange with the threads sticking out toward the "gasket rings," nuts could be screwed to them and the ring could be pulled up uniformly against the gasket and a tight fitting perfected.

Using this modified coupling here cut down the time needed to do the job and removed the principal fire hazard; also, it was not necessary to run water connections to wash out the line, nor was it necessary to drain water from the

line. The gasoline loss incurred in cutting the line with a hacksaw was negligible.

In a similar case, the same type of modified coupling was used to tie two lines together underground. It was impossible to make this connection without the use of a number of fittings and the expenditure of a relatively large amount of labor in any other way, welding being absolutely impossible as the connection was being made within a very few feet of the butane storage. The coupling was built in about the same manner, the only difference being that the flange that was welded into the center of the coupling as previously described, in this case had to be offset so that the center line of the flange horizontally was square with the bottom of the coupling sleeve itself, necessitating, of course, precise cutting and fitting by the welder when making this modified connection.

●

Conductive Belting Ends Static Hazard

"Conductive" rubber belting which will end static caused by friction, dangerous in the oil industry, was made possible by a discovery which turned rubber, originally an insulator, into a conductor. Thus in a product made from this substance static electricity which accumulates is harmlessly carried off.

Because of the low resistance of the material, however, there is no danger of an electrical connection from one transmission line to another should an accidental short circuit occur.

Transmission belts are the friction surface envelope type. They have been subjected to severe tests at speeds from 100 to 4,000 ft. per minute with the humidity as low as 16 per cent. When the resistance of the belts ran as high as 100 Magohms, measured between two electrodes 1 in. apart, these belts had shown no static on a sensitive gold-leaf electroscope.

Conductive V-belts are also available for drives on fans handling explosive vapors or equipment in hazardous industries.

JOHN ZINK BURNERS

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"You can't beat John Zink Burners"—for example, ninety more John Zink Burners are being manufactured right now on a repeat order for a huge Government Ordnance Plant. John Zink Burners meet rigid Government specifications.

The John Zink Burner Company is another Tulsa manufacturing plant that is 100% on war production.

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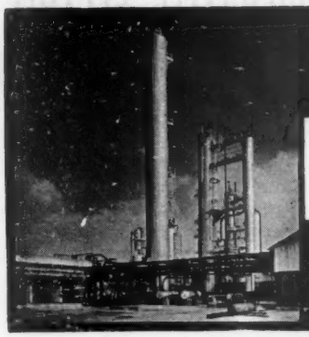

REFINERY ACTIVITY AND EXPANSION

Shell to Complete Butadiene Plant Middle of Next Year

Shell Oil Co., Inc., will accelerate its production of butadiene by the middle of 1943 when a plant, built for the Government, is scheduled for completion. This was disclosed at New York last week in a statement by R. G. A. van der Woude, president of Shell Union Oil Corp., a subsidiary operating in the eastern states. The company began its first commercial production of butadiene in a plant financed by it and completed several months before Pearl Harbor.

The company is continuing to produce toluene, the necessary ingredient for explosives, and its output of aviation gasoline has been increased materially since the start of this year.

The company was the first to start commercial production of a new blending synthetic having a special antiknock quality in the supercharged aviation engines, Mr. van der Woude said. It provides a means of immediately increasing the production of high-octane gasoline approximately 20 per cent because it can be manufactured in existing facilities with only minor alterations, involving the use of a negligible quantity of critical materials.

In reviewing the seriousness of the fuel-oil situation on the East Coast, Mr. van der Woude said that this is the time of the year when all oil companies build up their stocks of this product for the coming winter. This has been impossible up to the present time due to the tanker situation, in spite of the all-out effort and the assistance from various agencies in Washington. There are not enough inland delivery facilities, he stated, such as tank cars, pipe lines and barges, that can be substituted to offset this loss. To emphasize this seriousness he said that "oil companies, which have spent years to build up a fuel-oil market in the eastern territory, would not be urging their customers to convert their heating units from fuel oil to coal unless the situation was of great concern."

Two Technical Meetings In October Planned by W.P.R.A.

Plans are taking definite shape for two regional technical meetings of the Western Petroleum Refiners Association this fall, according to announcement by J. C. Day, secretary. First of the meetings will be held in Wichita, Kans., at the Allis Hotel, on Friday, October 9, followed by one in Shreveport, La., at the Washington-Youree Hotel, on Friday, October 30.

In arranging programs for the regional meetings this year, officials of the association indicate they expect to follow the same procedure as in previous years, with three technical papers to be presented at each meeting.

While the programs are not yet complete, the discussions will likely center around the effects of the war on the refining industry. There have been many new developments and changes, and these will be discussed as far as consistent and practicable. An open forum, always popular at these technical group meetings, will follow each paper.

Shamrock Revamps Poly Unit For Manufacture of Cumene

DUMAS, Tex.—Changes being made by Shamrock Oil & Gas Corp. in its poly gasoline unit at its Sunray refinery will enable this company to make cumene, a basic element in the manufacture of high-octane aviation fuel. Revamping of the unit is expected to be completed by September 1. The changes will not interfere with the production of poly gasoline or other products now being made.

Physical Constants of Isopropyl Benzene Reported

Isopropyl benzene, probably more generally known as cumene, is one of the aromatic compounds of petroleum hydrocarbons currently receiving considerable interest among refiners in connection with the manufacture of aviation gasoline.

Here are some of the pertinent physical constants of cumene:

Specific gravity	0.8581
Melting point	96.2° C.
Boiling point	152.4° C.
Index of refraction	1.4912
Viscosity, absolute (poises)	
0.0073 at 25°	
0.0049 at 60°	
Specific heat	0.43
Heat of vaporization	76.5
Heat of combustion—	
Kilogram calories per gram molecule under constant pressure	1246.5
C.T.S. (temperature of complete miscibility of the hydrocarbon and aniline	15.0° C.
Critical constants—	
Pressure (atms.)	32.2
Temperature	362.7
Vapor pressure—	
80.0° C.— 80 mm.	
120.0° C.—300 mm.	
Octane number—	
Motor method (blending)	87
Research (actual)	100
Research (blending)	128
Surface tension—	
Flash	52.0° C.

Ohio Cooperative Federation To Extend Refining Activities

COLUMBUS, Ohio.—Plans for extending petroleum activities of the organization into the refining field have been adopted by trustees of the

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Sketches of Plant Operators . . .

LOUIS B. WELLS, who has had a long and varied experience in refinery work with Sun Oil Co., has been made superintendent of the company's refinery at Marcus Hook, Pa. He succeeds Andrew MacMurtrie, who has become plant manager.

Starting work for the company in May 1924, after several months at Sun Ship as an electrician's helper, Mr. Wells has climbed steadily to his present position.

One of Mr. Well's first assignments was in the company's small experimental laboratory, where, in 1924, Arthur E. Pew, Jr., was developing the Mercury process for making lubricating oils. There, as a member of the small group entrusted to assist Mr. Pew, he performed many tests and other tasks incidental to the perfection of this process.

From there he went into plant operation, first at No. 9-A plant, the company's first continuous tube still. In time he was made foreman of this and two other plants. Next he was made assistant superintendent and was placed in charge of the lower refinery. About 2 years ago he was made assistant to Mr. MacMurtrie, then general superintendent, and placed in charge of the entire refinery.

He received his early education at Haverford, Pa., and later attended Andover Academy. He is married and the father of two children.

Ohio Farm Bureau Cooperative Federation. The organization with its 84 county member owners operates 60 local bulk plants, 175 petroleum delivery and transport trucks, and, in conjunction with other regional cooperatives, two oil-blending plants, all valued at $550,000. It now is proposed to acquire control of a positive supply of petroleum products for its 100,000 cooperative patrons.

Roy B. Jones Retires as Chairman of Panhandle

DALLAS, Tex.—A substantial stock interest in the Panhandle Producing & Refining Co., independent operator of producing properties, refineries, and marketing facilities in the Southwest, has been acquired by a group headed by Serge Rubinstein, New York, and Henry W. Wilson of Dallas, the company's president.

Common stock in an amount exceeding 22 per cent of the 905,407 outstanding $1 par value shares was bought by the Rubinstein-Wilson group. The bulk of these shares, comprising a block previously owned by the estate of the late W. R. Davis, was bought from the collector of internal revenue at Austin, Tex., at a sale held last week, while the balance was acquired from Roy B. Jones, the retiring chairman.

Coincident with consummation of the purchase, Mr. Rubinstein was elected chairman of Panhandle's board, and four other Rubinstein-Wilson associates, Hamilton Pell, a director of Standard Gas & Electric Co. and head of the Stock Exchange firm of Pell & Co.; George R. Kent, a director of Certain-Teed Products Corp.; William M. Erb, with the Stock Exchange firm of Carl M. Loeb & Co., and A. G. Foster, director of Midway-Victory Oil Co., were chosen directors.

Board members replaced by representatives of the purchasing group are Mr. Jones, the former chairman; Grier Bartol, H. C. Paetz, Arthur L. Hobson, Jr., and H. G. Collier, the latter of whom, however, remains with the company as secretary and treasurer. Continuing as directors, besides Mr. Wilson, the president, are R. C. Stanford, Orville Bullington, and R. E. Muller.

Incorporated under Delaware laws in 1919, Panhandle Producing & Refining, with headquarters in Wichita Falls, Tex., has resources just under $4,000,000. It engages in all phases of the petroleum industry — production, refining, and marketing. Outlets in Texas, southern Oklahoma, and New Mexico include 60 bulk and 203 retail stations, of which 32 of the former and 77 of the latter are owned or leased.

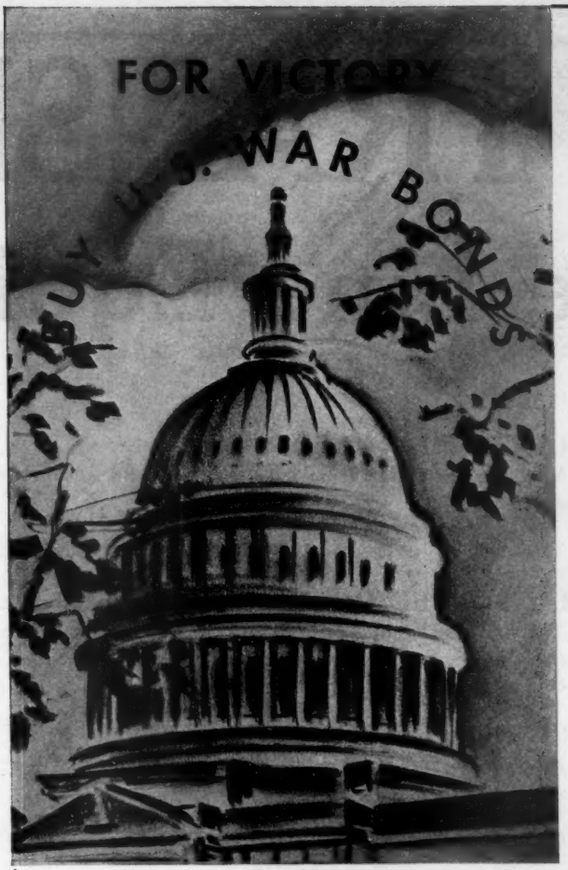
In addition, Panhandle owns, in whole or in part, leases covering 12,698 acres of producing property in Wichita, Archer, Young, Hutchinson, Gray, and Jackson counties, Texas, together with leases on several thousand acres of undeveloped oil lands. The company's two refineries have a combined daily capacity approximating 5,700 bbl., supplied by the company's own crude flow and that purchased from other sources. They are located at Wichita Falls and Lueders, Tex.

Metal in Lube-Oil Containers Prohibited After September 30

WASHINGTON, D. C.—Use, sale, or manufacture of lubricating-oil cans made of any metal after September 30 was prohibited in an order issued last week by the director general for operations.

Until that date, manufacturers are permitted to use inventories of terneplate produced prior to February 11, 1942, for 1-qt., 5-qt. and larger lubricating-oil cans.

It is expected that a new method of distributing lubricating oil will have been developed by the final date on which the terneplate containers can be used.



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Pipe-Line Activity

Texas Pipe Line Co. Prepares For Dallas-Stuart Project

Early this week Texas Pipe Line Co. has been making preparations for letting contracts for the immediate starting of construction on a project which will result in filling in between loops so that the company will have a double crude-oil line from Dallas, Tex., to Stuart, Okla. Bids have been submitted; plans call for handling the work in two contracts. Altogether the undertaking involves laying 109 miles of 8-in. and 10-in. pipe. Work on the two contracts starts at Dallas and Sherman, Tex. The company is taking up pipe from old lines and distributing it at points along the right-of-way.

Preliminary Arrangements Made For Bayou Pipe Line System

Rights-of-way, station sites, and terminal sites are being purchased and the bids are being taken as preliminary steps for the laying of the products line from the Houston area of Texas to Baton Rouge, La., which is known as Bayou Pipe Line System, headed by Shell Pipe Line Corp. This will feed the Plantation Pipe Line.

Plans are being studied for extending the Plantation system from Greensboro, N. C., to the Norfolk, Va., area.

Work Starts on Project Five El Dorado-Helena, Ark., Line

Clearing of right-of-way has already started for the 158-mile 10-in. products pipe line between El Dorado, Ark., and Helena, Ark., which is part of an undertaking known as Project 5. Ditching and welding are scheduled to be under way this week. Williams Brothers Corp., the contractor, has established a field office at El Dorado under the direction of George Allen, superintendent, and one at Helena under the direction of W. O. Poston, superintendent. Contract for construction was let by Gulf Refining Co. The project is building the El Dorado-Helena line to take products which have been moved through existing pipe lines previously in crude-oil service which have been converted and reversed for transportation from Gulf Coast refineries.

Northern Natural Lets Contract for Loop

Northern Natural Gas Co. is undertaking the laying of a loop of 24-in. pipe on the line west of the company's compressor station at Sublett, Kans. Contract for laying the pipe has been awarded to Ray L. Smith Construction Co.

Shipments Through Major Crude Systems Up 16 Per Cent

Oil handled by interstate pipe-line companies increased about 16 per cent during the first quarter this year, according to reports compiled by the Interstate Commerce Commission.

The 45 pipe-line companies reporting to I.C.C. handled a total of 391,260,957 bbl. of oil during the first 3 months this year compared with 328,029,380 bbl. for the same period in 1941. Revenue received by the companies was approximately unchanged from a year ago. The companies reported receipts of $54,166,853 for the first quarter of 1942 compared to $53,620,345 a year ago.

The most substantial increase in volume of crude handled was reported by Illinois Pipe Line Co., which, in shipping 28,341,049 bbl. of oil during the first quarter this year, moved 8,176,506 bbl. more oil than for the same time a year ago. Other large increases were reported by Sohio Pipe Line Co., up 7,339,205 bbl.; Buckeye Pipe Line Co., 6,280,895 bbl.; Ajax Pipe Line Corp., 5,163,150 bbl.; Humble Pipe Line Co., 5,132,504 bbl.; Sinclair Refining Co., 4,556,644 bbl.; Oklahoma Pipe Line Co., 3,578,829 bbl., and Stanolind Pipe Line Co., 3,186,518 bbl.

Declines, all of them comparatively slight, were suffered largely by pipe-line companies normally dependent on coastwise tanker movements to complete the delivery to eastern refineries.

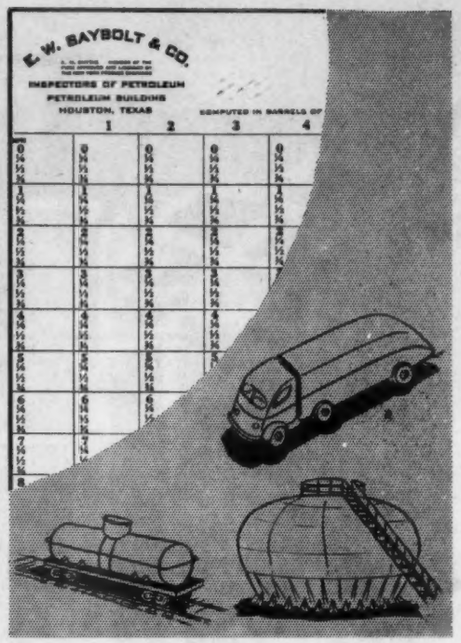
NUMBER OF BARRELS OF OIL ORIGINATED ON LINES AND RECEIVED FROM CONNECTIONS, JANUARY TO MARCH, INCLUSIVE

Company—	1942	1941
Ajax Pipe Line Corp.	6,074,811	1,511,661
American Liberty Pipe Line Co.	2,071,213	2,892,503
Arkansas Pipeline Corp.	1,743,763	1,150,287
Atlantic Pipe Line Co.	8,946,249	9,248,480
Bradford Transit Co.	2,246,276	2,121,802
Buckeye Pipe Line Co.	26,144,832	19,863,937
Buffalo Pipe Line Corp.*	740,658	778,775
Continental Oil Co.	2,690,954	1,391,750
Continental Pipe Line Co.	6,974,999	6,657,656
Empire Pipeline Co.	4,301,473	3,813,036
Eureka Pipe Line Co.	2,793,806	2,172,087
Great Lakes Pipe Line Co.*	4,173,675	3,274,440
Gulf Refining Co.	21,197,570	18,772,093
Humble Pipe Line Co.	37,053,671	31,921,167
Illinois Pipe Line Co.	28,341,049	20,164,543
Kaw Pipe Line Co.	6,135,569	4,576,615
Keystone Pipe Line Co.*	3,090,622	3,737,955
Magnolia Pipe Line Co.	19,239,970	17,788,890
National Transit Co.	4,806,566	4,351,756
Oklahoma Pipe Line Co.	9,698,753	6,119,021
Pan American Pipe Line Co.	6,062,992	6,073,644
Phillips Petroleum Co.*	3,910,698	4,451,135
Plantation Pipe Line Co.†	2,622,170	.....
Portland Pipe Line Co.†	1,705,294	.....
Pure Transportation Co.	8,468,078	7,772,273
Rocky Mountain Pipe Line Co.	966,857	1,152,664
Shell Pipe Line Corp.	14,543,004	13,130,599
Sinclair Refining Co.	21,527,609	16,970,965
Socony-Vacuum Oil Co., Inc.:		
Midland Pipe Line Division	4,947,655	4,847,807
White Eagle Pipe Line Div.	4,309,866	3,353,722
Sohio Pipe Line Co.	18,837,269	11,498,064
South West Pa. Pipe Lines	3,396,460	2,878,283
Standard Oil Co. of Louisiana	14,731,129	10,156,661
Standish Pipe Line Co.	9,961,736	9,248,641
Stanolind Pipe Line Co.	19,487,489	16,300,971
Susquehanna Pipe Line Co.*	3,660,415	4,776,563
Texas-Empire Pipe Line Co.	7,376,090	7,833,617
Texas-Empire P. L. Co. of Texas	3,413,032	4,416,546
Texas-New Mexico P. L. Co.‡	6,510,327	4,380,911
Texas Pipe Line Co.‡	24,126,077	26,279,316
Tidal Pipe Line Co.	4,022,541	4,466,246
Tide Water Pipe Co., Ltd.	1,488,738	1,072,034
Transit & Storage Co.	2,714,956	1,961,481
Tuscarora Oil Co., Ltd.*	3,285,583	2,744,733
Utah Oil Refining Co.	710,613	752,938
Total	391,260,957	328,029,380

*Company engaged primarily in handling refined petroleum.

†Operations commenced as follows: Plantation Pipe Line Co., January 1942. Portland Pipe Line Co., November 1941.

‡Number of barrels of oil is total delivered out of system.



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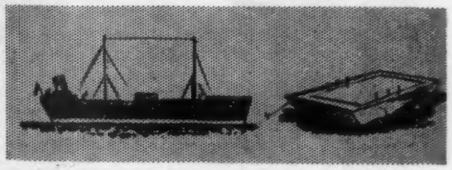

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FIELD DEVELOPMENTS...

HIGHLIGHTS FROM THE WEEK'S NEWS—

Biggest problem facing oil producers is the length of time present rate of production can be maintained under the curtailed drilling program caused by scarcity of equipment. The usual 6-month inventory showed that reserves failed to balance production by approximately 311,000,000 bbl., which is just about 85 days' supply of oil.

Most of the engineers who keep close watch on this estimate that at the present rate of drilling and consumption, it will be a matter of 2 or 3 years until the situation becomes really serious. At, or before, that time, it will be necessary to make a wholesale revision in the transportation facilities to supply the fields now curtailed by lack of outlet with a feasible means of getting their oil to market.

Already local shortages are developing. For instance, Michigan operators are making an effort to get the 40-acre ban lifted so they can drill enough wells to supply the demand for crude. Illinois has attempted the same and was rejected except for permission to drill the shallow wells closer together. Unfortunately, the supply to be obtained from shallow sands in that area is not very great. As this condition spreads, and more and more areas cannot supply the desired crude, purchasers will have to concentrate in the fields having present large reserves and low production.

The greatest danger, and a potential means of losing considerable amounts of much needed production, is the attempt to "force" production from some wells. In Kansas, for instance, practically all production men working in the area admit that in a great number of cases the stringent proration was a life saver for many of the fields as it prevented water encroachment. Increasing the production from such wells results in a temporary gain after which the wells begin to make more water and less oil and they may have to be abandoned in a short time. In other words, some of the areas with large reserves and potentials can supply only a strictly limited sustained production.

Relief from the situation by the reversal of the present trend does not appear to be in the immediate future although OPC and WPB are not considering the well-application method of granting permission to use material. This will permit the areas where the oil is needed the most to continue limited development.

NORTH TEXAS: A prospective Viola lime pool opener in Montague County is being deepened in an attempt to find sufficient pay for sustained production. A well in the Bryson pool, Jack County, is preparing to test the Mississippi lime and a new gas field is indicated in Coleman County (p. 74).

ILLINOIS: The St. Jacob field of Madison County is fast becoming one of the active spots in the Illinois basin and development is again under way in the Boulder pool, Clinton County (p. 70).

TEXAS GULF COAST: The discovery well of the Stewart field in Jackson County has been completed as one of the best producers ever drilled in the county and four outposts to the new well are drilling. The recently discovered Harmon field is extended to the west and development continues to expand production in the new Mayo and West Mauritz pools (p. 73).

OKLAHOMA: Viola lime production was opened in the northwestern tip of the Maud district and Wilcox production was found in the Dilworth gas pool of Kay County. Three completions in the Pauls Valley pool have extended the pool to the east and northwest (p. 71).

SOUTHWEST TEXAS: A new strike is indicated in the Berclair area of Bee County where a deep test is showing extremely high gas pressure. An important extension is promised in the South Caesar field and the discovery well of the Nordheim pool of De Witt County, still in the testing stage, continues to uncover additional gas-distillate sands in the Wilcox (p. 78).

INDIANA: Preparations are being made to test good McClosky saturation encountered in a Posey County wildcat southwest of the Mount Vernon field. Activity is increasing in the old Dodds Bridge field where a well near completion in the Devonian is reported to be flowing at a record rate (p. 70).

CALIFORNIA: An important new gas field is indicated in the delta region of Solano County. The southern limits of the South Belridge field of Kern County have been extended but an attempt to extend the Santa Maria Valley field met with failure (p. 69).

KANSAS: First Wilcox completion in the Lindsborg pool indicates production from that horizon will be considerably larger than previously anticipated. A new pool is reported in Rooks County (p. 79).

COLORADO: Location has been staked for a well on the North McCallum dome in the vicinity of the famous "ice cream" wells which are under discussion in connection with production of synthetic rubber. A deep test south of the Rattlesnake field which encountered a large gas flow has been shut in (p. 80).

COMPLETIONS IN ALL FIELDS . . .

(Week Ended August 1, 1942)

	Oil	Gas	Dry	Total	Footage	Tl. comp. to date 1942	Tl. comp. to date 1941
N. Y., Pa., and W. Va.	44	21	3	68	155,801	2,120	3,417
Ohio	2	12	10	24	62,702	616	944
Indiana	3	0	4	7	13,498	211	298
Kentucky	0	5	0	5	16,921	190	376
Illinois	26	2	17	45	120,862	1,014	1,968
Michigan	5	4	8	17	42,331	423	492
Kansas	16	4	11	31	96,559	907	1,234
Nebraska	0	0	1	1	2,705	24	55
Missouri, Iowa	0	0	0	0	0	9	25
Oklahoma	10	1	10	21	88,924	759	1,066
Texas:							
North Central Texas	12	3	8	23	70,238	722	1,630
West Texas	14	0	4	18	73,542	907	1,242
Texas Panhandle	6	1	1	8	25,722	249	343
Eastern Texas	7	0	6	13	63,989	248	638
Texas Gulf Coast	9	0	8	17	116,035	477	626
Southwest Texas	1	1	7	9	35,143	728	1,050
Total Texas	49	5	34	88	384,669	3,331	5,529
North Louisiana	9	0	2	11	47,408	291	380
Louisiana Gulf Coast	6	1	7	14	128,304	334	515
Total Louisiana	15	1	9	25	175,712	625	895
Arkansas	4	0	2	6	37,651	93	106
Mississippi and Southeast	0	0	0	0	0	45	145
Montana	3	1	2	6	13,115	99	156
Wyoming	2	0	0	2	8,191	57	103
Colorado, Utah	0	0	0	0	0	9	22
New Mexico	3	0	2	5	15,478	167	175
California	2	1	12	15	40,469	456	653
Total United States	184	57	125	366	1,305,588	11,155	17,659
Total previous week	184	41	117	342			
Week ended Aug. 2, 1941	468	69	162	699			

SPECIAL FEATURES

Neutron Logging: Porous zones are irregularly distributed in limestone pays and may frequently be missed in drilling. After the well is cased, perforating in search of higher pays may meet with considerable difficulty unless the location of the porous zone is accurately known. A logging method used in the location of porous zones in limestones, both cased and uncased, is described in Page 66.

Permian Basin: Exploration and development in the Permian basin fields of northern West Texas during the past 7 months and probable future development is reviewed on Page 67.

Neutron Logs Find Porous Zones in Western Kansas Limestones

By W. L. RUSSELL and R. B. DOWNING
Well Surveys, Inc. Lane-Wells Co.

Extensive field tests have shown that neutron logs are especially adapted to logging porosity in limestones and dolomites. This article may, therefore, apply to many other areas besides western Kansas.

OIL operators familiar with western and Central Kansas have long felt the need for some process which will log porosity. This need is occasioned by the occurrence of oil production in many variable porous horizons in a number of different limestone and dolomite formations, and by the fact that electric logs in this area do not indicate with sufficient accuracy the porous productive horizons. Furthermore, sample logs made before 1937 did not have the advantage of drilling-time logs and consequently proper allowance for sample lag could not be made. For these reasons, western Kansas is clearly a particularly favorable area for the application of the new process known as neutron well logging.

The Process

The process consists in subjecting the rocks surrounding the well to a penetrating bombardment of artificially produced neutrons, and measuring the effect on a detector (known as the ionization chamber) located a short distance above the neutron source. The response of the ionization chamber indicates primarily the amount of hydrogen in the rocks, and the substances in the strata which are richest in hydrogen are oil and water. Since these occur chiefly in pore spaces, the neutron curve is largely a porosity log. However, since the neutron log is affected by hydrogen regardless of whether it is in the pore space or in chemical combination in the molecules of rock substance, errors may be introduced if the neutron log is used to estimate the relative porosity of formations with markedly differing amounts of chemically combined water, such as limestone and shale.

Figs. 1 and 2 show neutron and radioactivity logs of two wells in Reno and Barton counties, Kansas. All these logs were made through casing and, incidentally, the fact that both radioactivity and neutron logs can be made with equal success in both cased and uncased wells greatly increases their usefulness. The radioactivity curve, which appears on the left-hand side of the figures, shows the relative amounts of shale in the formations—the greater the amount of shale, the further the log shifts to the right. On the other hand, the greater the porosity the further the neutron log shifts to the left, provided that the type of rock remains the same. It is necessary to use both radioactivity and neutron logs together to measure porosity, for if the neutron logs were used alone, it would be impossible to determine whether a shift to the left in the neutron log were due to an increase in the porosity of the limestone, or to an increase in the amount of shale present. Alternating nonporous limestones and shales will be expressed on the logs by curves which are mirror images of each other; porous limestones are indicated by peaks towards the left in the neutron log at depths where the radioactivity log is well to the left.

The sample log, compiled from the study of cuttings sifted from the mud fluid, is shown on the right-hand side of the figures. It is obvious that the sample log is in error as to the depths of some of the formations, but these errors are of course inherent in this method of logging. The column to the left of the sample log indicates the interpretation of the lithology and porosity, based on the neutron and radioactivity logs. The porous formation is chiefly limestone, but includes some sandy beds and some chat in the Mississippi lime.

Four Porous Zones

Fig. 1, showing the Reno County log, indicates clearly that the Mississippi lime contains four porous zones, from 3,384-92 ft., 3,304-25 ft., 3,337-60 ft., 3,270-93 ft. The radioactivity log indicates that these four peaks to the left on the neutron log are porous limestone, sandstone or chat, and not merely shaly zones; if shaly zones had been present the radioactivity log would have indicated them by throws (peaks) to the right, whereas it remains far to the left throughout the Mississippi lime. The sample log also suggests four porous zones in the Mississippi lime, though, as is to be expected, the depths do not agree exactly with those on the neutron log. In the shaly interval between the top of the Mississippi lime at 3,245 ft. and the base of the Kansas City-Lansing lime at about 2,935 ft., the radioactivity and neutron logs tend to be the mirror images of each other, indicating limy and shaly beds with little or no porosity in the limes. The Kansas City-Lansing limestones from 2,546-2,935 ft. show porous zones from 2,918-25 ft., 2,838-55 ft., 2,680-2,750 ft., and 2,645-55 ft.

The neutron log of the well in Barton County (Fig. 2) shows Kansas City-Lansing lime from 3,032-3,315 ft., and a highly porous zone in the limestone from 3,110-41 ft. It seems likely that such a porous zone should yield oil or water, especially if acidized. Between 3,210 and 3,216 ft., there is a zone of some porosity, and two slightly porous horizons from 2,810-25 ft. and 2,665-70 ft. Elsewhere the radioactivity and neutron logs are essentially mirror images of each other, indicating that the formations are chiefly alternations of shales and nonporous limestones.

While the neutron logs do not at present indicate the nature of the fluid contents of the reservoir rocks, they yield information about the depths, elevations, thicknesses, and continuity of the various porous horizons which will doubtless be very helpful in determining indirectly whether the connate fluids are oil, gas, or water. In many of the oil fields of western Kansas, the locus of the oil accumulation is determined chiefly or in part by variations in porosity. Hence, if neutron logs become numerous in this region, they should be helpful in finding the areas of oil accumulation on these stratigraphic traps, as well as in determining where to perforate.

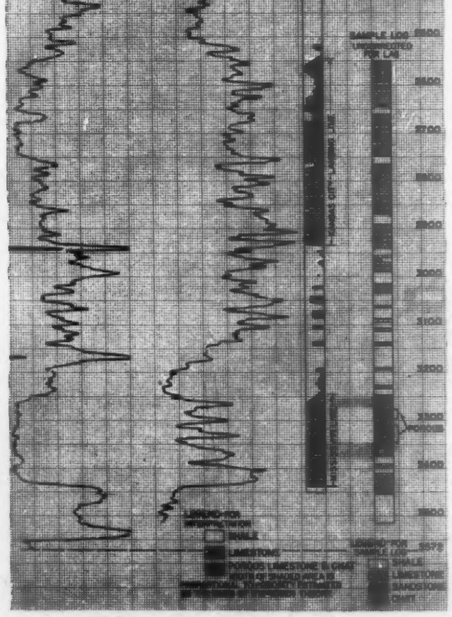


Fig. 1

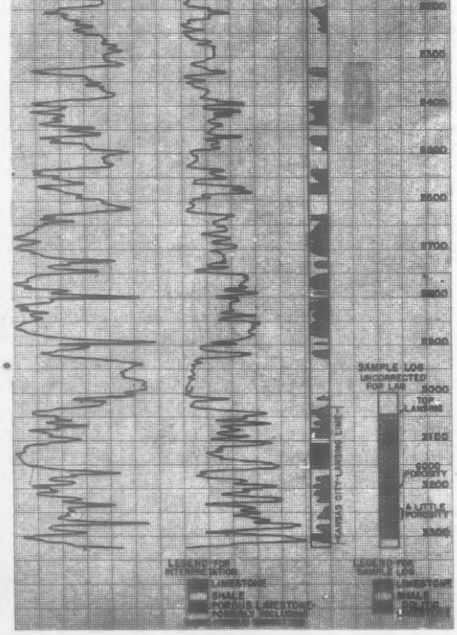


Fig. 2

Permian Basin Productive Area Shows Continuous Expansion

By ROBERT INGRAM

THE Permian basin of West Texas and Southeast New Mexico covers parts of six states and extends from Kansas on the north to central Terrell County, Texas, on the south, and from Tom Green County, Texas, on the east to the Guadalupe and Sierra Diablo Mountains of Culberson County, Texas, on the west—an area some 800 miles long and 300 miles wide.

There are two main geological features in the northern West Texas sector. On the west is the Central basin platform, a long, comparatively narrow platform-like feature which extends from the Hobbs-Monument producing area of New Mexico almost due south into Pecos County in southern West Texas. East of this platform is the Midland basin, which extends to the Bend arch.

Important production has been developed on both the platform and the eastern part of the Midland basin, but for the last few years activity has centered on the trend of fields on the east and west edges of the platform, assuming that the platform extends so as to include the Slaughter-Duggan field of Cochran, Hockley and Terry counties.

First Production

First West Texas production was in the Midland basin at the Westbrook field in Mitchell County, discovered by Standard Oil Co. of Texas (formerly the California Co.) in 1920. In 1922, when a total of 34,000 bbl. of oil was produced in Mitchell County, scarcely more than routine attention was being given to the possibilities of the great area to the west. In fact, it was not until 1925 and 1926 that development spread throughout the district.

In 1924 the Sharon Ridge pools of Scurry County were brought in. Iatan-Denman came in in 1925, and Chalk-Roberts (Howard-Glasscock) in 1926. Except for the Snyder pool in Howard County, discovered in 1937, this early development has accounted for all the major production from the Midland basin portion of northern West Texas to date.

The Westbrook pool is the fourth largest in the district from the standpoint of cumulative production (11,300,000 bbl.), but has had very little drilling in recent months. Fourteen wells were drilled in the Iatan-Denman district between January 1 and July 1, 1942, 11 wells at Sharon Ridge and 1 at Welch, an old one-well pool in Dawson County discovered in 1936 but abandoned until the second well was brought in this year by R. A. Albaugh.

The Lubbock pool, in Lubbock County, opened production in 1941 in a new area which may prove to be in the Midland basin, or may possibly be on the eastern rim of the platform if that platform turns northeast at Slaughter. There was no development at this pool during 1942, but three wildcats were drilled in the general area, all unsuccessful.

Outside of the activity mentioned above, exploration and development in northern West Texas between January 1 and July 1, 1942, was confined to the Central basin platform. Some 440 wells were drilled in the district of which all but 28 were oil wells, and 26 of the 28 dry holes were wildcats.

These figures reflect both the intensity of the activity in northern West Texas and the nature of the development and show how the drilling moved north from the Winkler, Ector, Ward, Crane and Pecos district where only 352 wells were drilled in the same period. The nature of the northern fields was largely responsible for this intense drilling. Being a relatively undeveloped area, it provided a seemingly limitless number of proven locations to be drilled, particularly in the big Wasson and Slaughter fields which were first worked in 1937.

Slaughter alone accounted for 313 wells (only one a dry hole) and Wasson for 51. In addition, Slaughter has not yet been defined, and, although it is generally believed that present production is close to the edge on fhe south, two wildcats came in in Cochran County which are expected to extend the field some 4½ miles north. (See discovery table.)

Activity Less Than Expected

Even this extensive activity was less than expected as drilling was sharply curtailed at the first of the year by the disruption in normal transportation facilities by the Nazi U-boat campaign in coastal waters of eastern United States. Most of the West Texas oil was formerly shipped to Gulf Coast ports for tanker movement to the eastern seaboard, and when the tanker movement was almost entirely cut off the Permian basin fields were the first to suffer.

There was steady drilling in practically all the fields on the northern platform, but outside of

NORTHERN WEST TEXAS FIELDS

Field, county, pay—	Discovery date	No. prod. wells	Est. daily av. prod. (bbl.)	Cumulative May 1, 1942 (thous. bbl.)	Depth (ft.)	Thickness of pay (ft.)	Gravity of oil °A.P.I.
Cedar Lake, Gaines, San Andres	1939	43	883	390	4,650	25	33
Chalk-Roberts, Glasscock-Howard, Yates	1927	823	13,868	102,013	1,280	20	32
Chalk-Rob., Glassc.-How., Seven Rivers	1926				1,650	20	32
Chalk-Rob., Glassc.-How., Grayburg	1929				2,150	30	30
Chalk-Rob., Glassc.-How., San Andres	1928				2,400	30	30
Chalk-Rob., Glassc.-How., San Angelo Clear Fork	1928				2,900	20	27
Dean, Cochran, San Andres	1937	2	37	81	4,900	25	30
Deep Rock, Fuhrman-West, Andrews, San Andres	1931	68	1,175	3,903	4,350	25	28
Emma, Andrews, San Andres	1937	64	1,685	1,095	4,190	25	34.6
Garza, Garza, San Andres	1935	4	23	134	2,800	20	(*)
Iatan, Denman, Howard	1926	303	4,001	15,613	2,450	50	27
Lubbock, Lubbock, Clear Fork	1941	1	5	2	4,870	...	28
Means, Andrews, San Andres	1934	121	2,683	5,769	4,475	25	29
Moore, Howard, Grayburg	1938	7	47	78	3,197	3	29.5
Ownby, Yoakum, San Andres	1941	5	120	44	5,235	70	27
Parker, Andrews, San Andres	1934	2	21	83	4,627	5	29.5
Rhodes, Cochran, San Andres	1941	1	8	3	5,050	...	31
Seminole, Gaines, San Andres	1937	288	6,263	4,863	5,000	90	34
Sharon Ridge, Scurry, San Angelo and Clear Fork	1938	166	1,176	1,059	2,250		30
Sharon Ridge, Shallow, Scurry-Mitchell, San Andres	1924				1,650		29
Slaughter, Cochran-Hockley-Terry, San Andres	1937	1,084	23,241	10,471	4,950	...	32
Snyder, Howard, San Angelo	1937	98	815	2,149	2,650	...	30.1
Waples-Platter, Yoakum, San Andres	1939	2	44	48	5,200	25	32.5
Wasson Deep, Gaines, Clear Fork	1940	1	40	28	6,210	...	34
Wasson-72, Gaines	1941	1	160	25	7,055	...	34
Wasson, Gaines-Yoakum, San Andres	1936	1,344	31,357	37,785	4,900	...	34
Welch, Dawson, San Andres	1941	1	36	6	4,918	33	10
West, Yoakum, San Andres	1938	1	30	38	5,168	10	31
West Andrews, Andrews, San Andres	1940	7	66	33	4,300	25	36
Westbrook, Mitchell, Clear Fork	1921	87	1,805	11,303	2,800	50	23
					197,016		

DISCOVERIES IN NORTHERN WEST TEXAS, JANUARY-JULY, 1942

Field and county—	Discovery well	Date	Production	Depth	No. wells
Welch, Dawson	R. A. Albaugh 1 J. J. Handley, Sec. 36, Blk. M, E.L. Sur., old pool in NW part of county, revives production.	1-17-42	San Andres, pumped 181 bbl.	4,910-86	1
Bieg-Wright, Cochran	Bieg Oil Co. 1 D. S. Wright, Lab. 12, Lge. 60, Martinez C.S.L. Sur., 3 mi. NW Slaughter.	1-31-42	San Andres, flowed 450 bbl.	4,040-4,983 (43-ft. pay)	1
Fullerton, Andrews	Fullerton Oil Co. 1 H. M. Wilson, Sec. 15, Blk. A-32, P.S.L. Sur., 7 mi. NW Shafter Lake.	3- 7-42	Clear Fork, flowed 682 bbl.	7,045-8,005 (200-ft. pay)	4
Embar, Andrews	Phillips Petroleum Co. 2 University, Sec. 30, Blk. 10, midway between North Cowden Deep and West Andrews pools.	5-23-42	Ellenburger, flowed 1,421 bbl.	7,770-7,835 (85-ft. pay)	1
Mascho, Andrews	Mascho Oil Co. 1 Sun-University, Sec. 27, Blk. 10, 2 mi. N Emma.	6- 6-42	Big lime, pumped 178 bbl.	4,420-4,514 (18-ft. pay)	1
Sunray-Wright, Cochran	Sunray Oil Co. 1 D. S. Wright, Lab. 14, Lge. 61, Martin C.S.L. Sur.	7-20-42	San Andres, pumped 237 bbl.	4,848-4,950	1

Slaughter and Wasson, most notable development was in southwestern Andrews County where the Deep Rock-Fuhrman-West Fuhrman (Walker) area was being developed into another big field and the West Andrews pool, opened in 1940, was being extended over some 15 sections by the Phillips Petroleum Co. which was forced to drill to protect its leases from the state university.

But the well that probably did more than any other to foreshadow the future of northern West Texas was none of these. It was Phillips Petroleum Co. 2 University-Andrews, Section 30, Block 10, University Survey, midway between the North Cowden deep pool in Ector County and the first production in the West Andrews pool. Besides establishing production in the Permian lime to foreshadow a link with West Andrews, this well opened Ellenburger production with a 1,400-bbl. well. It was the first Ordovician field in the district.

Search for deep Ordovician production has been going on spasmodically for the past 12 or 13 years in West Texas, but most of the search has been in the southern area where some important pools have been found. In this southern section, however, where Permian possibilities have been pretty well explored, the Ordovician possibilities hold out a major incentive for new exploration and development. In the north, on the other hand, Permian fields are still relatively undeveloped and little attention has been paid to the deep zone.

In fact, the only fields in the northern district that have been tested to the Ordovician are West Andrews, Chalk-Roberts and Wasson "77." In none of these was it productive.

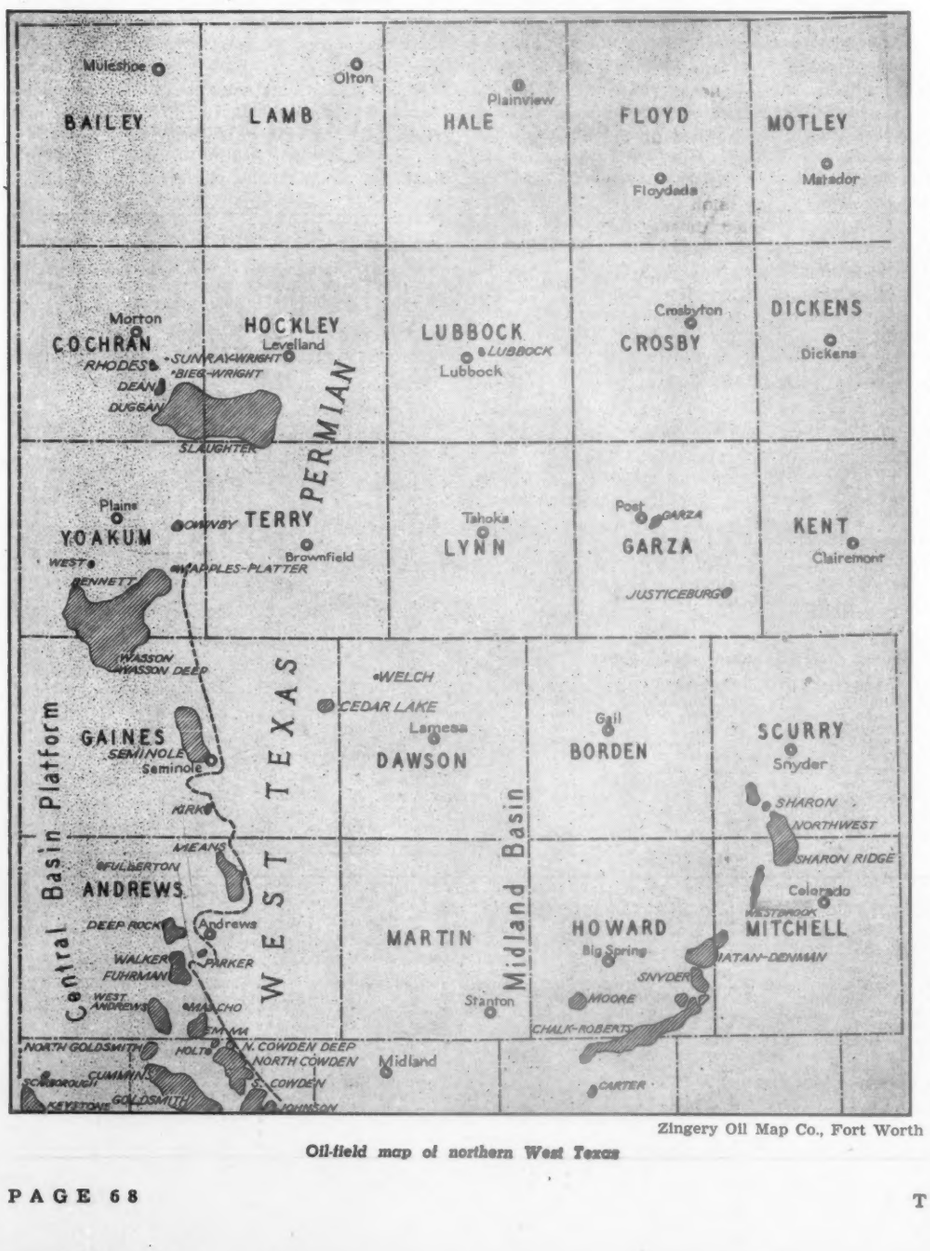
The Phillips Ellenburger discovery, which has been named Embar, thus indicated that Ordovician exploration in the northern area will increase measurably. But more important even than the opening of a new zone in the district is the fact that the Ordovician pool was found in conjunction with what appears to be another large-area Permian pool and when the two have been defined, much important subsurface information regarding the relationship between the structures on the two sections will be revealed.

Many geologists believe that the Ordovician highs are usually much smaller in area than the Permian, and that often two or three or even more Ellenburger structures will underlie the big Permian fields, the intervening Ordovician lows having been filled in before the Permian was laid down. This group expects the Embar pool to be limited on the north less than half way to the present West Andrews pool while West Andrews itself will probably extend to and include Permian production at Embar.

This belief is not altogether accepted, however, and it appears likely that a thorough test of this area will be made. Of some two score active operations or locations in the West Andrews-Embar area, nearly half are scheduled to test the Ordovician.

In addition, wells now being drilled to the Permian to hold leases, are being completed with 8-in. casing which will permit deepening at a later date. A deepening program here would probably develop quickly if Ellenburger pay should be found over a wide area as most of the shallower wells are small and so far do not compare with Slaughter or Wasson or Seminole in initial potentials.

Thus, the first 6 months of 1942 resulted in a pronounced swing in activity to the northern West Texas fields, left a still large number of proven locations to be drilled, opened an entirely new zone for exploration throughout the area and pointed to continuous development over a long period of time.



Zingery Oil Map Co., Fort Worth

Oil-field map of northern West Texas

Active Search for Gas In Southwest Ontario

In Ontario, the keen demand for petroleum products is reflected in some lessening in the previous rate of decline in crude production from the old shallow fields. No new oil areas have been opened, and efforts of petroleum producers are concentrated on securing the largest possible production from the old wells. New drilling has been almost entirely devoted to efforts to secure additional natural-gas reserves, through redrilling old areas and wildcatting in new fields. The summary areas and wildcatting in new fields.

COMPLETIONS IN ONTARIO, FIRST HALF 1942

Township—	Wells	Gassers	M.f.c.	Dry holes
Binbrook	1	0	0	1
Caistor	2	2	45	0
Camden	1	0	0	1
Camden Gore	1	0	0	1
Canboro	1	1	18	0
Chatham	16	2	799	14
Dawn	1	1	525	0
Delaware	1	0	0	1
Dereham	1	0	0	1
Dunn	1	1	1,000	0
Gainsboro	1	1	15	0
Lake Erie	1	1	185	0
Malahide	15	6	1,361	9
Malden	1	0	0	1
Mersea	1	0	0	1
Moulton	2	2	65	0
Middleton	3	0	0	3
North Cayuga	3	3	312	0
Oneida	3	1	45	2
Onondaga	2	0	0	2
Orford	1	0	0	1
Rainham	3	2	26	1
Raleigh	3	0	0	3
Seneca	2	2	30	0
Sherbrooke	4	3	342	1
South Cayuga	1	0	0	1
South Dorchester	1	0	0	1
Southwold	1	0	0	1
Townsend	1	0	0	1
Tuscarora	1	1	25	0
Wainfleet	6	5	505	1
Walpole	41	25	1,831	16
Westminster	1	0	0	1
Windham	5	2	635	3
Woodhouse	3	0	0	3
Yarmouth	2	0	0	2
Total	134	61	7,764	73

Indiana to Offer River Lease

Due to Indiana laws, parts of rivers classed as navigable are owned by the state. This law vests title to the east half of the Wabash River, from the center of the river to its east bank through the Griffin oil field. Since large producing wells are located on both sides of the river in the Griffin field, it is a proven oil field, and a lease on the river bed will soon be sold at auction according to present plans of the geology division of Indiana Department of Conservation.

There is little doubt that the lease will produce oil but drilling of the lease will probably present trouble. The U. S. War Department, which has jurisdiction over all navigable streams, will not permit a derrick in the river since it would be a menace to navigation. Directional drilling from the river bank is possible, but the river bank does not belong to the state. It is the property of land owners whose land is already producing oil from which they obtain royalty, and they probably will not allow use of their land to take oil from under the river.

Solano County May Have New Gas Field in Delta Region

By L. P. STOCKMAN

LOS ANGELES, Calif.—Standard Oil Co. appears to be on the verge of discovering another new gas field at the eastern end of Suisun Bay in the delta region of Solano County and the result of a test under way should be available within a very short time. This potential discovery well in a new gas field is 2-1 Suisun Community in 25-3n-1w with bottom of the hole at 7,300 ft. and 5½-in. casing landed at 6,779 ft. This wildcat was recently cemented with 430 sacks of cement under a pressure of 1,000 lb. but as soon as the pressure was released the well blew gas up through the annular space between the 9⅝ and 5½-in. casing and began coming to the surface in the surrounding marshy area adjacent to the rig. The company then perforated 4 holes at 2,400 ft. and squeezed in some additional cement between the two strings of casing. The depth at which this well hit the gas sand is considerably deeper than the same probable zone has been encountered in other gas wells in this general locality.

Second Wildcat Planned

Standard has drilled several tests in the Suisun area and is at present making preparations to spud in 1-2 Suisun Community in 35-4n-2w, about 6 miles northwest of the wildcat now being tested for production. The company's 1-2 is the second wildcat to be drilled in the area northwest of 2-1 Suisun Community. Standard's Suisun wildcat is west of the Tracy gas field and southwest of the Rio Vista gas field. The latter field is by far the most productive gas field in California at the present time and it likewise contains the largest amount of productive acreage which extends across the Sacramento River and lies in Solano and Sacramento counties. Rio Vista, due to conversion of the Stanpac gas line to crude oil, will be expected to show greatly increased production during the coming winter months to make up for the loss of gas resulting from the conversion of the natural-gas line from the San Joaquin Valley. Obviously if Standard succeeds in completing 2-1 Suisun it will be able to deliver this additional gas to the P. G. & E. distributing system for general use in the San Francisco Bay region. This Suisun wildcat of Standard is located within 25 miles of the company's refinery which is located on San Pablo Bay which lies north and adjoins San Francisco Bay.

Drilling operations have shown a slight increase in the Rio Vista gas field during the past few weeks and at present there are three strings of tools in operation. During the early part of the current week, Standard Oil Co. completed 1 Shafer-McCormack in 16-3n-3e flowing 15,889,000 cu. ft. of dry natural gas per day from 4,270 ft. The company's 1 Terschuron in 27-4n-3e is in the pay and should be flowing within the next few days. Amerada Petroleum Corp., discoverer of the Rio Vista gas field, recovered 2,917 ft. of salt water on a test of 1 Upham at 4,350 ft. and a plug has been put in bottom. This test was of the interval at 4,320-50 ft. and it is possible that the salt water encountered may be bottom water in which event the plug on bottom may correct the difficulty. This well, together with Standard's 1 Terschuron and 1 Shafer-McCormack, are being drilled by Brown Drilling Co. On McDonald Island in the McDonald Island gas field, Standard Oil Co. has spudded in 1 Woods Community in 21-1n-5e and should reach the pay within another 15 days. Standard discovered commercial gas production in the McDonald Island gas field and has finished several good wells since discovery. A recent check indicates the probability that a number of gas wells will be drilled within the next several months as a good gas well is better than an oil well producing high-gravity oil due to curtailment of oil production. Standard Oil Co. has been aggressively developing gas production in the central part of the state and also has a number of gas wells in the San Joaquin Valley.

South Belridge Extended

E. A. Parkford has extended the southern limits of shallow production in the South Belridge field of Kern County by completing 2 Belridge pumping 45 bbl. of 15.9-gravity oil per day from 1,097 ft. This extension well, which moved out the productive limits of the field approximately 1,500 ft., had 130 ft. of oil sand in the interval 895-1,097 ft.

A number of shallow wells have been finished in the South Belridge field during the past few months and with additional productive acreage opened up in the southern part of the field by E. A. Parkford and Union Oil Co. additional drilling may be expected during the next several months as this shallow production is of low gravity which is now in big demand to meet refinery requirements for fuel oil. Present drilling at South Belridge includes three wells under way and locations staked for six more.

General Petroleum Corp. is making good progress in 61-33 Gallagher at Paloma and the outcome of drilling should be known within the next month. This well located along the northern section of the Paloma distillate field will prove an important factor one way or another as it will extend the productive limits of the field if it results in commercial production and will define the limits if it proves a dry hole. Several other operators hold potentially productive acreage in this immediate area and a successful completion would tend to prove up some of this acreage for production. Plans have been completed for a recycling unit at Paloma, but according to latest information available the necessary authority for material has not yet been issued. For the past several months, Western Gulf has been operating a 300-hp. pilot plant and the operation of this plant has permitted the company to determine the proper size and type of permanent plant to be built. Western Gulf, Texas and Ohio Oil Co. are oerating on a unit plan on acreage of Kern County Land Co. and thus if additional wells are completed along the northern edge of the field they will be eligible to join this repressuring unit upon completion and under certain conditions. Gulf, Texas and Ohio along with Kern County Land attempted to work out a unit operation for the entire field, but one operator and one landowner refused to sign and thus prevented consummation of the program. Since that time Union Oil Co. has drilled a dry hole in the southern end of the field and in doing so has limited production in that direction. The original unit plant of Gulf, Texas, Ohio and Kern County Land was approved by all but a couple of interested people and it will be interesting to watch what they will do with their respective acreage and how much it will cost. Gulf, Texas, Ohio and Kern County Land are now in a favorable position and it is up to other operators to prove their acreage productive before they will be eligible for participation. Under the original plan it was proposed to include all potentially productive acreage in the plan regardless of whether it was ultimately productive or barren.

SAN JOAQUIN VALLEY COMPLETIONS

Belridge, South, Kern County: E. A. Parkford 2 Belridge, 12-29s-21e, pumped 45 bbl., 15.9-gravity, 15 per cent cut, T.D. 1,097 ft., perf. 895-1,097 ft., comp. in upper zone of Pliocene age, extends productive limits 1,500 ft. east.

Ciervo wildcat district, San Benito County: Superior Oil Co. 1 Reay, 35-16s-11e, dry, T.D. 3,853 ft., Kreyenhagen 1,975 ft., Eocene 3,074-3,853 ft., no show.

Edison wildcat district, Kern County: M.T.M. Associates 1 Edison, 23-30s-30e, abandoned because of mechanical trouble, T.D. 1,058 ft.

Jasmine wildcat district, Kern County: A. J. Borget 1 Jasmine, 16-25s-27e, dry, T.D. 1,005 ft., no important show.

Kettleman Hills wildcat district, Kings County: Bristol Oil Co. 1 Hellman, 2-25s-19e, dry, T.D. 2,184 ft., cored tar accumulation but no commercial showings of oil or gas were found.

Mount Poso, Kern County: Union Oil Co. 32 Sarret & Mack, 4-27s-28e, pumped 195 bbl., 16.1-gravity, 55 per cent cut, T.D. 1,830 ft., perf. 1,777-1,830 ft., comp. in Vedder zone of Miocene age 1,799-1,830 ft.

Pyramid Hills wildcat district, Kings County: Pacific Oil & Gas Co. 41 West Slope, 20-24s-17e, dry, T.D. 2,087 ft.

Rio Vista, Sacramento County: Standard Oil Co. 1 Shafer-McCormack, 16-3n-3e, flowed 15,889,000 cu. ft. gas, pressures 1,640/1,450 lb., T.D. 4,270 ft., green sand 4,102 ft., white sand 4,238 ft., comp. in Emigh gas zone of Cretaceous age.

Round Mountain, Kern County: R. S. Lytle 8 Coffee, 6-28s-29e, abandoned in gray sand, T.D. 1,766 ft., Vedder zone of Miocene age 1,709-35 ft., wet, bottomed in gray water sand.

Shale Hills wildcat district, Kern County: Etienne Land 2 Shale Hills, 30-26s-19e, abandoned in gray sand, T.D. 1,485 ft., only minor showings of heavy oil were logged.

Tulare wildcat district, Tulare County: Richfield Oil Corp. 1 Churchill, 35-20s-24e, dry, T.D. 5,566 ft., bottomed in sand and shale, no shows.

Wheatville wildcat district, Yuba County: B. U. Cain 1 Cox, 18-14n-53, dry, T.D. 1,805 ft.

Attempted Santa Maria Valley Extension Fails

Union Oil Co.'s attempt to extend the productive limits of the Santa Maria Valley field 1 mile west of present production met with failure this week when 1 Mathison in 16-10n-35w was abandoned in the Franciscan basement at 5,550 ft. This outpost failed to show anything more than a few stringers and its abandonment was not unexpected. This loss will probably be offset soon, however, as the company has 15 Union Sugar in 19-10n-34w in the pay at 5,240 ft. and 2-3 Bradley Lands in 36-10n-34w is bailing for production. On the Rice ranch lease in the Orcutt district of Santa Barbara County, Standard is cleaning out 1 Rice ranch after recovering from a fishing job that delayed work for several weeks. This well at 8,560 ft. was running very deep and had not yet reached the Miocene contact with the result that the outlook is not any too good. In Ventura County, Royalty Service Corp. is entering the Oxnard district, where a heavy tar accumulation was found several years ago and will drill a test on the Leonard property in 29-2n-22w. At Rincon, Chanslor-Canfield Midway Oil Co. is drilling ahead in brown shale at 9,760 ft. and is making good progress. This well is being drilled as a deep conclusive test in the Rincon field where wells drilled above 10,000 ft. have encountered a very tight oil sand. It is thought that if a hole can be drilled through the 10,000-ft. zone a much more porous sand may be found. In the Ventura Avenue field, Lloyd Corp. of which Ralph Lloyd is president, was attempting to complete 1 Lloyd from 10,340 ft. On a test early in the week the well flowed for a short time at a daily rate of 2,000 bbl., but the water cut approximated 50 per cent. This well is located in the extreme eastern end of the Lloyd property in the Ventura Avenue field and not far from several excellent flowing wells that Lloyd has already completed. Shell Oil Co. and Tide

(Continued on Page 81)

ILLINOIS FIELD REPORT

St. Jacob Pool Looms as Active Spot in Illinois Basin

MATTOON, Ill.—Looming more important in Illinois production figures each week is the St. Jacob pool of Madison County, discovered in May by M. D. Bryant. Production from four wells already completed in the pool is from the Trenton lime. The field is the westernmost discovery in the Illinois basin since the start of the current drilling campaign in 1937.

At week's end Bryant and Obering were completing 1 Kerr Community, SW SW NE 16-3n-6w, after swabbing 711 bbl. in 24 hours. This well is the first in the new pool to be acidized and is turning out to be the largest producer. It was acidized with 3,000 gal. and first swabbed at the rate of 500 bbl. daily. The Trenton pay was encountered at 2,374-79 ft. and 5½-in. casing was set to 2,374 ft.

Another well in the pool showing for a large producer is the Sohio Production Corp. 1 Fred Meyer, 15-3n-6w, which swabbed at the rate of 32 bbl. an hour after an acid treatment of 500 gal. No. 1 Meyer is producing from 65 ft. of porous pay in the Trenton. Three other tests are drilling in the pool and permits have been issued for several more.

Boulder Activity Resumed

Development of the Boulder pool was resumed last week after being delayed most of the past month by high water in the Kaskaskia River bottoms. Two good wells were completed in the pool during the week and pipe was set to test an attempted east extension. The test, J. C. Auffenburg 1 Louis Stein, SW SW SW 36-3n-2w, Clinton County, is reported to have cored good saturation in the Benoist and is already regarded as an extension to the pool.

Three miles west of the northern edge of the St. James pool, Fayette County, Doran and Youngblood encountered water trouble in their Benoist discovery, 1 Charles Bush, SE NE NW 28-6n-2e. No. 1 Bush found the Benoist at 1,897 ft. and cored about 8 ft. of fair saturation. Hole was bottomed at 1,905 ft. Some water intruded with oil when plug was drilled and it is being plugged back in an attempt to eliminate the water. If the well cannot be successfully plugged back and water eliminated by pumping, operators plan to drill ahead to the McClosky.

Clay County Test Encounters Aux Vases Saturation

The Lain Oil & Gas Co. last week was reported to have cored saturated Aux Vases sand at its 1 Haines Community, NE NE 25-3n-5e. Located 6 miles west of Flora and 6 miles from other oil production, the test should give an active new oil area if successfully completed.

Lario Oil & Gas Co. has completed 1 Jacobson-Starr, N½ SW SW 1-3s-4e, Jefferson County, as a new pool opener. No. 1 Jacobson-Starr, located about 10 miles due east of Mount Vernon, is producing from the Levias lime at 3,079-81 ft. The initial production of the well was 224 bbl. of oil and 111 bbl. of water. There are three other tests in the area.

ILLINOIS COMPLETIONS

Wildcats

Bond County: Bond County Gas Co. 1 E. O. Davies, E½ SE SW 20-6n-3w, dry at 765 ft., junked hole.

Clay County: Nat. Pet. 1 V. Iffert Comm., NW SW SE 3-4n-8e, dry at 3,129 ft., Tar Springs 2,335 ft., Glen Dean 2,464 ft., Golconda 2,542 ft., Cypress sand 2,665 ft., Weiler 2,715 ft., Paint Creek 2,774 ft., Benoist sand 2,838 ft., Renault 2,906 ft., Aux Vases sand 2,925 ft., Ste. Genevieve 2,966 ft., McClosky 3,022 ft., St. Louis 3,125 ft.

Clinton County: Texas 1 A. Conrad, NE SE SW 8-2n-1w, dry at 1,700 ft., Glen Dean 1,110 ft., Golconda 1,169 ft., Cypress sand 1,265 ft., Paint Creek 1,358 ft., Benoist sand 1,445 ft., Renault 1,462 ft., Aux Vases sand 1,476 ft., Ste. Genevieve 1,568 ft.

Franklin County: E. S. Adkins 1-Q Montgomery, SE SW NW 20-5s-2e, dry at 2,926 ft., Kincaid 1,704 ft., Degonia 1,730 ft., Clore 1,823 ft., Palestine 1,857 ft., Menard 1,973 ft., Vienna 2,089 ft., Tar Springs sand 2,116 ft., Glen Dean 2,242 ft., Hardinsburg 2,256 ft., Golconda 2,337 ft., Barlow 2,433 ft., Cypress sand 2,496 ft., Paint Creek 2.567 ft., Benoist 2,667 ft., Aux Vases 2,716 ft., Levias 2,781 ft., Rosiclare 2,799 ft., Fredonia 2,848 ft., McClosky 2,872 ft.

I. W. Taylor 13 Old Ben Coal, SE SW NE 19-5s-2e, dry at 2,741 ft., Menard 1,965 ft., Waltersburg 2,028 ft., Vienna 2,078 ft., Tar Springs 2,087 ft., Glen Dean 2,198 ft., Hardinsburg 2,246 ft., Golconda 2,316 ft., Barlow 2,415 ft., Cypress 2,438 ft., Weiler 2,440 ft., Paint Creek 2,558 ft., Benoist 2,647 ft., Aux Vases 2,723 ft.

Hamilton County: Ohio 1 Moore, NE SE NW 35-6s-5e, pumped 146 bbl. oil and 26 bbl. water, 5-qt. shot 3,306-10 ft.. Aux Vases 3,296-3,309 ft.. T.D. 3,315 ft., *pool opener.*

Jefferson County: E. B. Gill 1 Threlkeld, NE SW 13-4s-2e, dry at 2,905 ft., Kincaid 1,722 ft., Menard 1,963 ft., Tar Springs 2,086 ft., Glen Dean 2,164 ft., Golconda 2,257 ft., Barlow 2,427 ft., Cypress sand 2,431 ft., Benoist 2,626 ft., Aux Vases 2,675 ft., Ste. Genevieve 2,715 ft.. Rosiclare 2,761 ft., Fredonia 2,793 ft.

Texas 1 Willie Ford, SW SE NE 10-3s-3e, dry at 3,044 ft., Glen Dean 2,306 ft., Golconda 2,401 ft., Barlow 2,524 ft., Paint Creek 2,698 ft., Benoist 2,710 ft., Renault 2,782 ft., Aux Vases 2,792 ft., Ste. Genevieve 2,846 ft., McClosky 2,905 ft., St. Louis 3,040 ft.

Morgan County: Hills & O'Connell 1 J. W. Sharp, NE NE SW 25-13n-10w, dry at 952 ft., Salem 223 ft., Kinderhook 600 ft., Devonian 807 ft.

Perry County: W. C. McBride 1 Miller, NE NW SW 30-5s-1w, dry at 1,620 ft., Kincaid 544 ft., Menard 658 ft., Waltersburg 738 ft., Tar Springs 800 ft., Glen Dean 900 ft., Hardinsburg 953 ft., Golconda 972 ft., Cypress 1,117 ft., Paint Creek 1,225 ft., Benoist 1,322 ft., Renault 1,347 ft.. Aux Vases 1,368 ft., Ste. Genevieve 1,504 ft., Rosiclare 1,526 ft., Fredonia 1,551 ft.

Pulaski County: R. G. Williams et al 1 W. L. Richey, NE SE SW 9-15s-1e, dry at 3,885 ft., Keokuk 400 ft., Osage 430 ft., Chattanooga 658 ft., Silurian 2,123 ft., Thebes sand 2,570 ft., Kimswick 2,630 ft., Platin 2,721 ft., Joachim 3,485 ft.

Richland County: Helmerich & Payne 1 Deitrich, W½ SE SW 1-4n-10e, dry at 3,171 ft., Glen Dean 2,520 ft., Golconda 2,592 ft., Cypress 2,786 ft., Paint Creek 2,896 ft., Benoist 2,906 ft., Renault 2,975 ft., Aux Vases sand 2,990 ft., Ste. Genevieve 3,048 ft., Fredonia 3,070 ft., St. Louis 3,168 ft.

Saline County: Buell & Herndon 1 C. Wilson, NE SE NW 9-8s-5e, dry at 3,202 ft., Menard 2,088 ft., Glen Dean 2,349 ft., Golconda 2,485 ft., Barlow 2,637 ft., Weiler 2,684 ft., Benoist 2,776 ft., Benoist sand 2,802 ft., Renault 2,852 ft., Aux Vases 2,952 ft., Ste. Genevieve 2,984 ft., McClosky 3,025 ft.

Wabash County: Magnolia 1 Ernest, SE NE NW 34-2n-12w, dry at 2,320 ft., Biehl 1,505 ft., Tar Springs sand 1,678 ft., Glen Dean 1,729 ft.. Hardinsburg 1,744 ft., Golconda 1,807 ft., Barlow 1,891 ft., Paint Creek 1,995 ft., Benoist 2,033 ft., Renault 2,107 ft., Aux Vases 2,157 ft., Ste. Genevieve 2,188 ft., McClosky 2,219 ft.

Wayne County: H. H. Weinert 1 Cruse, S½ SE SE 28-1s-8e, pumped 20 bbl. oil and 20 bbl. water, perf. 3,252-66 ft., 3,000 gal. acid, perf. 3,276-80 ft., Fredonia 3,262-67 ft., T.D. 3,380 ft., P.B. 3,290 ft.

Ben J. Taylor 1 Sims, NW SE 24-1s-6e, dry at 3,262 ft., Kincaid 2,014 ft., Palestine 2,142 ft., Glen Dean 2,600 ft., Golconda 2,696 ft., Barlow 2,792 ft., Cypress sand 2,812 ft., Weiler 2,872 ft., Paint Creek sand 2,992 ft., Benoist sand 3,055 ft., Renault 3,091 ft., Aux Vases 3,102 ft., Ste. Genevieve 3,164 ft., Fredonia 3,216 ft., McClosky 3,231 ft.

White County: Cherry & Kidd 1 O. Smith, SW NE SW 15-4s-14w. dry at 3,018 ft., Menard 2,071 ft., Waltersburg sand 2,148 ft., Glen Dean 2,374 ft., Gol-

(Continued on Page 80)

INDIANA, OHIO, KENTUCKY

Posey County Wildcat to Test McClosky Saturation

EVANSVILLE, Ind.—Gulf Refining Co. last week rigged up cable tools to test good saturation encountered in the McClosky lime at their 1 Oscar Reiss, W½ SW NW 23-7s-14w, Posey County wildcat about 2½ miles southwest of Mount Vernon. This well is 3 miles from other oil production and, from present indications, seems sure to open a new oil area. McClosky pay was found from 2,737-42 ft. and the well was drilled to a total depth of 2,744 ft. At latest reports mud was being bailed from the hole preparatory to drilling plug.

Activity is increasing around the Dodds Bridge pool, 6 miles northwest of Sullivan in Sullivan County. Ohio Oil Co. 1 C. J. Walters, NW SE 3-8n-10w, is flowing from the Devonian at the estimated rate of 35 bbl. an hour. The Devonian pay in this well was encountered at 2,387-2,407 ft. In addition, two new locations have been staked in the field. These are J. H. Gilliam 1 Campbell-Woodard, NE SW SW 34-9n-10w, and Niagran Oil Corp. 1 C. Blount, NW SW NW 1-8n-10w.

INDIANA COMPLETIONS

Gibson County: Continental 53 Maier, SE cor. 11-3s-14w, pumped 46 bbl., Cypress 2,489-2,500 ft., T.D. 2,570 ft.

Henry County: Knightstown Natural Gas 1 Birket, NE SE NW 36-16-9, dry, T.D. 907 ft., Trenton 896 ft.

Pike County: Southwestern Development 2 Carpenter, NE NW SW 19-1n-6w, dry, T.D. 988 ft.

Posey County: W. C. McBride 12 Swander, NW SE NE 4-4s-14w, pumped 223 bbl., McClosky 2,892-2,900 ft., T.D. 2,902 ft.

Continental & Gulf 3 Erwin, SE SW NE 1-7s-14w, pumped 75 bbl., Mansfield, T.D. 2,029 ft., P.B. 1,317 ft.

Longhorn 1 Greathouse, NW SE SE 11-7s-15w, dry, T.D. 2,997 ft.

Randolph County: J. M. Seip 1 Fraze, SW SE SE 28-21n-14e, dry, T.D. 1,105 ft.

OHIO

ZANESVILLE, Ohio.—A gas strike north of San Toy, Perry County, gaged better than 1,000,000 cu. ft. in the Clinton at 3,867 ft. A producer flowing 75 bbl. from the Clinton sand was reported at Blackeyville, Wayne County. The Hinkley pool, Medina County, yielded a gasser gaging 2,700,000 cu. ft.

OHIO COMPLETIONS

Ashland County, Sullivan Township: Kemrow Co. 1 Spencer Equity, Lot 5, show gas, shot, plugged, T.D. 2,769 ft.

Vermillion Township: Ohio Fuel 1 William Bell, Sec. 14, show gas, no increase after shot, plugged, Clinton, T.D. 2,858 ft.

Athens County, Carthage Township: C. W. Nuzum 1 J. D. Evans, Fraction 35, 350,000 cu. ft. gas, Salt sand, T.D. 912 ft.

A. K. Engle 1 C. M. Bradford, Sec. 11, dry, Berea, T.D. 1,621 ft.

Guernsey County, Washington Township: George Jewell 2 Elizabeth Combs, Sec. 15, dry, Berea, T.D. 1,255 ft.

Licking County, Eden Township: Lacknette et al 1 Ida Titus, Sec. 8, 350,000 cu. ft. gas, Clinton 2,659-89 ft., T.D. 2,699 ft.

National Drlg. Co. 1 K. Nethers, Sec. 18, dry, Clinton 2,770-95 ft., T.D. 2,800 ft.

Lorain County, Lagrange Township: E. R. Cain 2 Vincent Zalka, Sec. 1, dry through Clinton sand, T.D. 2,246 ft.

Medina County, Hinkley Township: Ohio Fuel 3 Frank Smith, Lot 69, 2,270,000 cu. tf. gas, Clinton, T.D. 3,415 ft.

Meigs County, Rutland Township: F. Mullenix 1 C. F. Anderson, Sec. 29, dry, Keener (water), T.D. 894 ft.

Monroe County, Malaga Township: Spangler & McCourt 1 Walter Chrisman, Sec. 35, 25,000 cu. ft. gas, shot, Berea, T.D. 1,649 ft.

Washington Township: Hall & Henning 1 Clifford Howell, NW Sec. 23, 68,000 cu. ft. gas, Berea grit, T.D. 2,090 ft.

Morgan County, York Township: Gas Producing Co. 3 Theodore Eppley, Sec. 34, dry, Clinton, T.D. 3,094 ft.

Muskingum County, Brush Creek Township: Gas Producing Co. 2 Adam Fisher, Sec. 18, dry, Clinton, T.D. 4,047 ft.

Washington Township: Ohio Fuel 1 H. F. Reed, Lot 21, 110,000 cu. ft. gas, shot, Clinton 3,956-86 ft., T.D. 4,066 ft.

(Continued on Page 79)

OKLAHOMA FIELD REPORT

Viola Lime Production Opened In Maud District

By CARL HOOT

ANOTHER discovery was reported last week in Oklahoma to bolster the state's declining production. However, the nature of this new well was on the order of the majority of those found since Cement and Apache which are more or less connecting wells between old pools. However, the Pauls Valley has prospects of developing into a major pool.

In the Maud area of Pottawatomie County, Mid-Continent 1 Lovelace, NW NW SE 12-8-4, flowed 325 bbl. of oil in 12 hours after being shut in and then made 240 bbl. initial potential, open flow, through casing. The well was drilled to 4,455 ft. in the Wilcox, but production is from Viola lime at 4,310-30 ft. Location is in the northwestern tip of the Maud district which is dotted with several small pools producing from Misener sand, Hunton lime and Simpson dolomite, with average depths of 4,090-4,430 ft. The Maud area is some 12 years old and there has been little or no drilling there over the past 2 years.

Pauls Valley Pool Expands

Three completions in the Pauls Valley pool of Garvin County have broadened the field on the east and on the northwest, Texas 1 Patchell, SE cor. 25-4-1w, indicated a northwest-southeast trend when it was brought in for one of the largest producers in the pool. Initial production was a flow of 3,135 bbl. in 19 hours from sand at 3,937-4,063 ft. It is ½ mile northwest of the discovery. On the extreme eastern edge, Pure Oil 1 Cashian-Teter, SE SW NE 31-4-1, was completed for 30 bbl. an hour from sand at 4,090-4,115 ft.

North St. Louis Area Active

The St. Louis area of Pattawatomie County continues to report good Hunton lime wells. Several, during 1942, have made in excess of 500 bbl. Last week S. K. Vierson 2 Duncan, NE SW SE 21-8-4, flowed 360 bbl. from Hunton at 3,907-37 ft. One well completed there the previous week flowed 640 bbl. in 24 hours.

Wilcox Production Found In Dilworth Gas Pool

In northern Oklahoma, Kay County reports a small Wilcox sand well in the Dilworth gas pool. C. A. Leonard 1 Larrabee, a wildcat in NE SE SE 24-28-1w, pumped 20 bbl. of oil from the second Wilcox found at 3,427-42 ft. Location is near the edge of the gas area and is about 2 miles west of the Dilworth oil pool.

Oklahoma Panhandle

Two large gas wells were reported in the Oklahoma Panhandle last week. In the Guymon section of the Hugoton field of Texas County, Cities Service Gas Co. 1 Murdock, SW SW NE 9-4n-15e.c.m., flowed 24,000,000 cu. ft. of gas a day from sand at 2,638-2,800 ft. Republic Natural Gas Co. 2 Adams, SE SE 34-6n-16e.c.m., was somewhat smaller, making 17,000,000 cu. ft. of gas from 2,846 ft.

OKLAHOMA COMPLETIONS

Wildcats

Hughes County: Phillips 1 Wilksmith, NW SE SW 31-7-11, dry, T.D. 4,672 ft., Cromwell 4,478 ft.

Kay County: C. A. Leonard 1 Larrabee, NE SE SE 24-28-1w, pumped 20 bbl., second Wilcox 3,427-42 ft.

Logan County, NW of Lovell: Fain-Porter and Continental 1 Cain, NE NW SW 8-18-4w, dry, T.D. 6,437 ft., Layton 4,775 ft., Mayes 5,719 ft., Woodford 6,009 ft., Viola 6,180 ft., Wilcox 6,332 ft., second Wilcox 6,428 ft.

Noble County, 6 mi. S of Liberty: Magnolia and Wilcox 1 Janke, SE NE 10-21-2, dry, T.D. 4,532 ft., Oswego 3,630 ft., Bartlesville 3,950 ft., Viola 4,428 ft., Wilcox 4,485 ft., second Wilcox 4,515 ft.

Okfuskee County: Phillips and British American 1 Hollingsworth, SW SW NW 13-12-9, dry, T.D. 3,925 ft., Bartlesville 2,530 ft., Booch 2,865 ft., Woodford 3,680 ft., Hunton 3,705 ft., Viola 3,838 ft., Wilcox 3,883 ft., second Wilcox 3,899 ft., D.S. test at 3,700-12 ft. recovered 130 ft. oily mud.

Oklahoma County: Mid-Continent 1 White, NE SE NW 35-12-1, dry, T.D. 6,143 ft., Oswego 5,230 ft., Woodford 5,635 ft., Hunton 5,703 ft., Viola 5,888 ft., Wilcox 6,022-82 ft., second Wilcox 6,121 ft.

Seminole County: Joel Scroggins 1 Patterson, NW cor. 30-6-7, dry, T.D. 1,672 ft.

Fields

Crescent, Logan County: Continental 2 Ferguson, SW NW SE 27-17-4w, flowed 159 bbl., Layton 4,911-49 ft.

Cumberland, Marshall County: Pure 2 Thompson-205, SE SW SW 21-5s-7, flowed 394 bbl. in 4 hr., sand 4,900 ft. and 5,015 ft., T.D. 5,786 ft.

Cushing, Payne County: Kingery Prod. 1 Stroops, N½ SE SE 34-19-6, dry, T.D. 3,460 ft.

Hotulke, Pottawatomie County: Crosbie and Atlantic 1 Trice, SW NE 23-9-4, pumped 62 bbl., Hunton 4,261-70 ft., T.D. 4,285 ft.

Liberty, Noble County: J. E. Crosbie 1 Wilkerson, NW NE NE 16-22-2, dry, T.D. 4,552 ft.

Lucien North, Garfield County: Magnolia 1 Montgomery, NW SE NW 36-21-3w, dry, T.D. 5,562 ft.. Viola 5,347 ft., Wilcox 5,442 ft., second Wilcox 5,551 ft.

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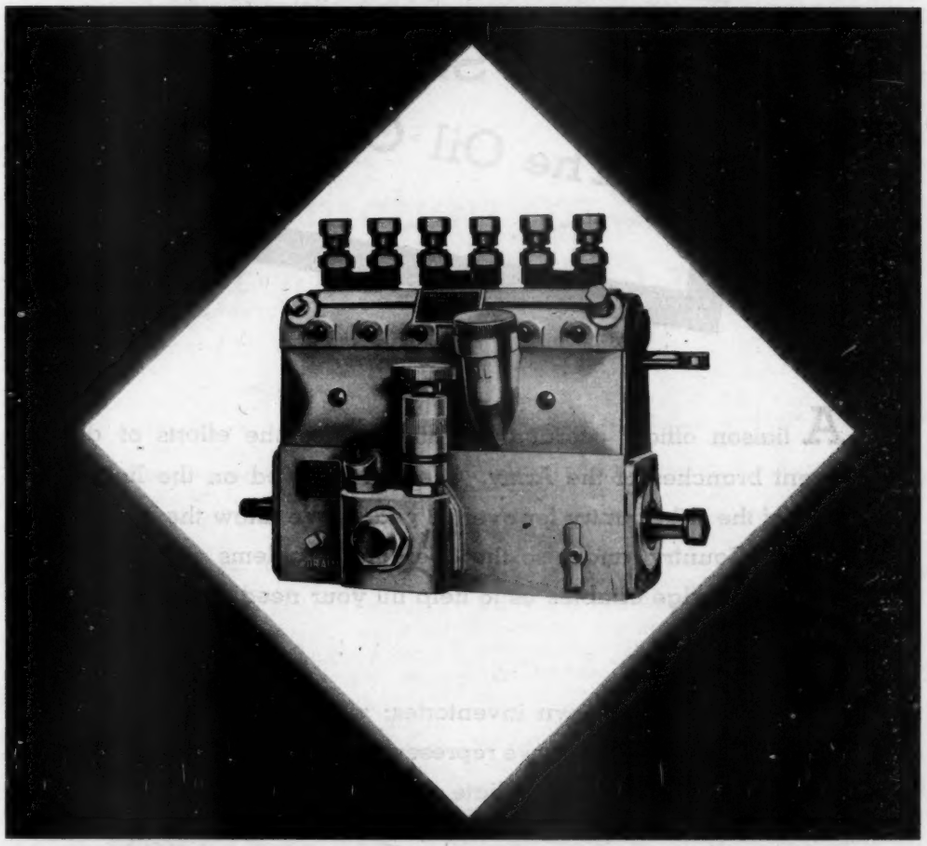

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Cherokee County Deep Test Recovers High Gravity Oil

By ROBERT INGRAM

DALLAS, Tex.—Prospects of deep production in Cherokee County at Humble Oil & Refining Co. 1 Curtis, Vaughn Survey, 3 miles northwest of Larissa, brightened as a result of a drillstem test run early in the week. The test was made at 10,169-85 ft., with 3,000-ft. water cushion. Six joints of mud and three joints of high-gravity oil were recovered in 1 hour and 15 minutes through ¾-in. chokes. There was no water.

It was not reported whether the oil was recovered from the Pettit or the Rodessa sections. If the Pettit, there was a very slight interval between the porosity sections. Flowing pressure was 1,750 lb., with bottom-hole pressure of 6,430 lb.

Drilling was resumed after the test, and apparently the hole went out of the porous section above 10,266 ft. as drilling reportedly was harder. At the week's end, the well was drilling below 10,425 ft. with no change reported.

Near Mixon, in the north central part of the county, Magnolia Petroleum Co. started moving in for 1 S. E. Braly, Josiah Thomas Survey, a scheduled 9,000-ft. operation.

Wildcat Progress

Operations got under way on British American Oil Producing Co. 1 Lemmon, Roberson Survey, scheduled 7,000-ft. wildcat 2 miles northwest of Lodi in southern Cass County. Another wildcat due to start was Davis & Myers 1 Rollins, John Heller Survey, Paluxy project 3 miles northwest of Campbell in Hunt County. Near Dawson, in south Navarro County, Falcon Oil Co. 1 Keitt, Benton Survey, had reached its announced 6,000-ft. depth and was drilling ahead at last report. Formation was given as lime and shale, and apparently the Smackover objective had not yet been reached. Lyman T. Davis of Corsicana, Tex., who already has drilled two unsuccessful wells near the Bazette townsite in northeast Navarro County, was getting ready to try again with another Woodbine wildcat 2 miles southwest of the town. It will be 1 Ben P. Walker, John Millican Survey, in the area where John Hooser of Dallas earlier this month completed a 37,000,000-cu. ft. gasser from the Woodbine on the Ella Black farm in the Balthrop Survey.

Only One of Three New Pools Booming

Four new wells were completed in the Black Oak pool of Wood County last week and nine rigs were running in the area, making it the most active in the district. This contrasted with the new Club Lake (Wieland) pool in Hunt County where reports had it that after one more test was made at its 1 Morrison, Harrison Survey, Humble was scheduled to pull out of the play. Also with the new Kildare pool in Cass County, which, after being dormant for several months after discovery, had one more well drilled, then, last week, Phillips Petroleum Co. announced it was making no further plans for drilling there.

EAST TEXAS COMPLETIONS

Wildcats

Freestone County: Haynes B. Ownby Drilling 1 O. B. Utley, J. Claypool Sur., 1 mi. SE of Stewards Mills, dry, Pecan Gap 2,352 ft., Austin chalk 3,250-3,609 ft., Woodbine sand (show oil) 3,983 ft., T.D. 4,011 ft.

Houston County: Coastal Refining 1 Southern Pine Lumber, C. W. Tier Sur., 9 mi. E of Ratcliff, dry, Carrizo 1,095 ft., Wilcox 1,280 ft., Midway 4,065 ft., T.D. 4,280 ft.

Red River County: A. H. Carpenter et al 1 S. Stanley, W. P. Snell Sur., 11 mi. N of Clarksville, dry, T.D. 2,350 ft.

Fields

Black Oak (Coke), Wood County: Amerada 1 L. C. Darby, M. Y'Barbo Sur., flowed 209 bbl. in 18 hr. through ¼-in. choke, T.D. 6,395 ft.

Amerada 1 E. L. Faulk, J. Knight Sur., flowed 237 bbl. in 18 hr. through ¼-in. choke, perf. 6,230-6,346 ft., T.D. 6,380 ft.

Amerada 2 C. B. Kennemer, J. Knight Sur., flowed 167 bbl. in 18 hr. through ¼-in. choke, perf. 6,275-6,364 ft., T.D. 6,370 ft.

General American 1 D. P. Rodney, M. Y'Barbo Sur., flowed 144 bbl. in 6 hr. through ¼-in. choke, T.D. 6,418 ft.

Club Lake, Hunt County: Humble 1 J. Bracken, N. Voyles Sur., dry, Austin chalk 1,918 ft., Woodbine 2,876-90 ft., T.D. 2,942 ft.

Chapel Hill, Smith County: Sinclair Prairie 1 P. L. Brooks, J. Slayden Sur., flowed 345 bbl. through ¼-in. choke, perf. 8,16-8,202 ft., T.D. 8,393 ft.

Hawkins, Wood County: Humble 1-B M. A. Kay, J. C. Burnett Sur., flowed 100.65 bbl. in 6 hr. through ¼-in. choke, perf. 4,740-4,848 ft., Pecan Gap 2,966 ft., Austin chalk 3,954 ft., Woodbine 4,360 ft., T.D. 4,857 ft.

Talco, Franklin County: Byrd-Frost 1 Evans, J. Brantly Sur., pumped and flowed 196 bbl. in 13½ hr., Pecan Gap 1,595 ft., Georgetown lime 3,490 ft., Paluxy 4,124 ft., oil sand 4,132-64 ft., T.D. 4,253 ft.

EAST TEXAS BORDER COMPLETIONS

Wildcats

Cass County: W. A. Patterson et al 1 F. A. Orr, G. W. Morris Sur., dry, T.D. 3,340 ft.

San Augustine County: Roper & Todd 2 Long Bell Lumber, Hyden Sur., dry, Wilcox 2,480 ft., T.D. 4,000 ft.

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TEXAS GULF COAST

Drilling Is Started at Four Outposts to Stewart Field

By F. L. SINGLETON

HOUSTON, Tex.—With the official completion of W. S. Boyle 1 Rose & Sample, the discovery well of the Stewart field, Jackson County, interest was centered on the four outpost wells which were started by the same operator. These locations are 1 Bertha Gopsey, about 2,000 ft. northeast, 2 Rose & Sample, about the same distance southwest, 1 Pagel, about 5,000 ft. due west, and 1 Meyer, 1 mile to the southwest. Permits for additional wells have been granted, while production from any of the four wells now drilling would call for several offsets by other companies.

On an 8-hour potential test, flowing through a ⅛-in. choke, the discovery well flowed 43 bbl. from perforated casing opposite the oil sand at 4,985-96 ft. On a recent 24-hour test flowing through a ¼-in. choke, the well flowed better than 700 bbl. daily to rank as one of the best producers to be completed in the county.

With the discovery of this new field, plus the expansion of production in the three other recent discoveries, Mayo, Harmon, and West Mauritz, this county is maintaining its position as the most active area in the Texas Gulf Coast.

As development continues to expand the producing area of the Harmon and Mayo fields it appears that production of these two fields will be eventually joined. This is based largely on the completion of Gulfboard 1 Dale Burditt the past week which flowed at the rate of 240 bbl. daily through a 5/32-in. choke from a perforated depth at 5,324-35 ft. The completion extends the Mayo field about 3,000 ft. southwest in the direction of the Harmon field, and a distance of only about 4,500 ft. separates the two fields. The Burdett completion is of interest in view of the fact that it is only about 1,500 ft. northwest of a 6,000-ft. dry hole drilled in 1937 by Sam Harrison on the H. A. Meyer lease which probably means that a northeast-southwest fault is located between the dry hole and producer.

Harmon Field Extended

In the meantime, a west extension of about 2,000 ft. was marked up in the Harmon field as Gulfboard 1-A Branch flowed 175 bbl. daily through a $\frac{7}{32}$-in. choke from perforated casing at 5,364-82 ft. The location is southwest of the discovery well and northwest of Sun 1 Harmon. The next location to be drilled by Gulfboard is 2-C Harmon, 2,000 ft. southeast of production and in line with production of the new West Mauritz field. Ownership of all four fields is held by numerous companies and as production continues to be expanded additional operations will have to be started, consequently each operation now drilling is being followed with considerable interest.

As field activity increases, wildcat activity continues to be expanded. Locations for two more tests were announced during the week. W. S. Boyle staked location for 1 A. C. E. Simmons in the G. Sutherland Survey, which is more or less a semiwildcat to the new Stewart field, being located about a mile to the southeast. The other operation is J. A. Gray and John G. Mayo 1 Rose & Sample, 2 miles northwest of Navidad in the Navidad gas field area, E. B. Hill Survey.

In the North Bay City area, Matagorda County, Ohio 1 McDonald recovered salt water on two production tests at 8,257-59 ft. and 8,251-53 ft., and at the close of the week a test was scheduled to be made of sand at 7,865-84 ft. It was from this sand that a previous drill-stem test recovered several hundred feet of oil and final completion is expected to be made here. The well also tested pipeline oil at 8,406-08 ft., but due to high gas-oil ratio, it was killed and during the past several weeks has been in the process of testing other sands in the Frio formation logged by an electrical log.

Wildcat Exploration Increases

Field development in other areas is still scattered and during the week there were only four completions reported other than in Jackson County. While field development is at a low ebb, there is evidence of an increase in wildcat exploration work as several new locations are scheduled to be announced. The major share of this activity is centered in those counties located westward from Houston where a total of 20 wildcat operations are now under way.

TEXAS GULF COAST COMPLETIONS

Wildcats

Grimes County: H. L. Hunt 1 Yeager, dry, T.D. 5,345 ft.

Harris County: McDannald Oil Co. 1 East Texas Oil Co., dry, T.D. 4,500 ft.

Jackson County: J. G. Mayo et al 1 Kasper, dry, T.D. 6,020 ft.

G. Warren-Salt Dome 1 Zazieck, dry, T.D. 6,515 ft.

Matagorda County: Continental 1 Rugely, dry, T.D. 6,800 ft.

Montgomery County: Superior-Atlantic 1 McMahan, dry, T.D. 12,955 ft.

Tyler County: R. E. Fair 1 Sturrock, dry, T.D. 7,526 ft.

Fields

Ganado, Jackson County: Texas 3 Sellman, 51 bbl., ⅛-in. choke, perf. casing 6,625-28 ft., T.D. 6,654 ft.

Harmon, Jackson County: Gulfboard 1-A Branch, 175 bbl., $\frac{7}{32}$-in. choke, perf. casing 5,364-82 ft., T.D. 5,565 ft.

Mayo, Jackson County: Gulfboard 1 Burdett, 240 bbl., 5/32-in. choke, perf. casing 5,324-35 ft., T.D. 5,470 ft.

North La Ward, Jackson County: Stanolind 1 Johnson-Pickering, 105 bbl. oil and 1 bbl. salt water, ⅛-in. choke, perf. casing 5,215-20 ft., T.D. 5,228 ft.

Old Ocean, Brazoria County: Harrison & Abercrombie 13 Bernard River Land Co., 500 bbl., ¼-in. choke, top sand 9,985 ft., T.D. 10,826 ft.

Red Fish Reef, Chambers County: Humble 32-A-247 State, 171 bbl., ⅛-in. choke, perf. casing 9,592-9,604 ft., T.D. 11,858 ft.

Sour Lake, Hardin County: E. C. Hankamer 1 Hooks, dry, T.D. 3,083 ft.

Stewart, Jackson County: W. S. Boyle 1 Rose & Sample, 43 bbl., ⅛-in. choke, 8-hr. potential test, perf. casing 4,985-96 ft., T.D. 6,523 ft.

West Ranch, Jackson County: Magnolia 254-A West Ranch, 165 bbl., 7/64-in. choke, perf. casing 5,774-78 ft., T.D. 5,779 ft.

Withers, Wharton County: Texas 113-C Pierce, 84 bbl., ⅛-in. choke, perf. casing 5,298-5,308 ft.

LOUISIANA GULF COAST

Open Production on Southwest Flank of Avery Island Dome

By F. L. SINGLETON

NEW ORLEANS, La.—Although still in the testing stage, Humble 2 Petit Anse Co., located on the southwest flank of the Avery Island dome, Iberia Parish, showed promise of opening the first production for this old dome. Drilled to a total depth of 9,242 ft., perforations were made at 9,012-19 ft., and the well flowed at the rate of 14 bbl. of 32-gravity oil per hour through a $\frac{7}{16}$-in. choke. Tubing pressure was 1,750 lb. Shortly after the well was brought in it began to show salt water, and 15 hours later it was flowing at the rate of 28 bbl. of fluid per hour, of which 9.8 bbl. was oil and 18.2 bbl. was salt water, and tubing pressure had decreased to 1,000 lb. At the end of the week perforations had been squeezed and the well was scheduled to be retested. The well is located in 25-13s-5e, and is the second to be drilled by the company, the first test having been abandoned although sufficient showings were logged to cement casing for testing.

Avery Island is one of the oldest salt structures in the district, having been discovered in 1862. It is a member of a group of domes generally referred to as "Five Islands," extending in an almost straight line in a northwest-southeast direction through St. Mary and Iberia parishes. Included in this group besides Avery Island are Jefferson Island and Weeks Island, Iberia Parish, and Belle Isle and Cote Blanche in St. Mary Parish. Only two of the domes now remain nonproductive, these being Weeks Island and Cote Blanche. However, spasmodic development around the latter two is being done and there is little doubt that production on both will eventually be developed.

Encouraging showings were reported logged in Gulf 1 Delta Securities, a wildcat located 14 miles southwest of New Orleans in 13-15s-21e. Two feet of sand showing oil was recovered in a core at 2,281-86 ft., 3 ft. of sand with oil show at 3,080-85 ft., and 3 ft. of sand showing oil at 3,088-3,107 ft. No drill-stem test was attempted and the well is drilling ahead. This is a geophysical prospect consisting of several thousand acres in which geophysical work is reported to have shown favorable results. In addition to the well now drilling, location for a second test has been made in the same section, although actual drilling will no doubt be held up pending outcome of the present well.

Another attempt to open flank production on the old Napoleonville dome, Assumption Parish, was marked up as a failure with the abandonment of William Helis 1 Dugas-LeBlanc, in 55-12s-13e, which was quit at a total depth of 11,128 ft. after an electrical log failed to show encouragement. This is the deepest test ever drilled around the flank of the structure. In spite of recent failures, exploration is expected to continue due to the encouraging showings logged in previous wells.

Second Well Completed in West Mermentau Field

H. M. Naylor 2 Acadia Development Co., the second well drilled in the West Mermentau field, Acadia Parish, and located south of the discovery well, was officially completed, flowing 121 bbl. of amber-colored distillate in 12 hours. The well was gaged through a 14/64-in. bottom-hole choke and a 20/64-in. tubing choke. Total depth is 10,581 ft., with the top of the producing sand at 10,175

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Viola Lime Saturation Reported In Montague County Wildcat

By ROBERT INGRAM

WICHITA FALLS, Tex. — Good chances for a new Viola lime pool in Montague County were seen last week at Continental Oil Co. 1 Jack Hildreth, Block 53, E.T. Survey, 8 miles north of Bowie. However, at week's end the well apparently still lacked sufficient pay to sustain production and drilling was resumed at total depth 6,703 ft.

Early in the week the well was reported to have swabbed some 18 bbl. of new oil while unloading the oil used in drilling. Soft lime had been topped at 6,546 ft. and after the well started to unload Christmas tree was installed and it flowed 50 bbl. of oil load in 4 hours through tubing. Then it went dead. Swabbed, it flowed 35 bbl., still oil load. The swabbing was continued, after acid treatment, and the fluid level was holding at 2,500 ft. when decision was made to drill deeper.

Several other wildcats in the district were also in the testing stages. Sinclair Prairie 2 Henderson, Martin Survey, 2 miles northeast of Denver, made a drill-stem test at 6,189-6,218 ft. after making repairs to the rig, but recovered only mud. The same company's 1 Eanes, Bench Survey, southwest of Bowie, was drilling in shale at 4,488 ft.

Jerry Hawkins 1 Lowrie, Section 2824, T.E.&L. Survey, 4 miles northwest of Bowie, was below 7,040 ft. in shale.

Mississippian Tested at Bryson

In the Bryson pool of Jack County, Hill & Hill, Inc., 5-B Clayton, L. Knight Survey, was swabbing down preparatory to perforating in the Mississippi lime at 5,145-5,320 ft. The test had been drilled to 5,435 ft. and 5½-in. liner set at 5,360 ft. This is a deep test in the old shallow pool.

Deep exploration in the county also added another location, Anderson-Prichard 1 Hoefle, northwest corner of the A. James Survey, ¼ mile north of the 4,900-ft. Hoefle pool. At the same distance south of the pool, Hanlon-Buchanan and Standard Oil Co. of Texas were to begin testing at 1 Porter, John Porter Survey, which had set pipe at 5,858 ft. in the Caddo lime. Six miles to the south, Shell Oil Co., Inc., 1 Lester Carter, Section 3311, T.E.L. Survey, was drilling in shale at 3,183 ft.

Young Test Shows Gas

Panhandle Refining Co. 1 Brundage, J. Townsend Survey, Young County wildcat, drilled plug from 7-in. casing set at 3,375 ft. and made an estimated 2,000,000 cu. ft. of gas with a spray of oil. The test probably will be taken deeper into the Caddo. It had topped the Caddo at 3,382 ft. and cored from 3,386 to 3,395 ft., recovering 8 in. of lime with a show of oil. Pipe was set after this show.

NORTH CENTRAL TEXAS COMPLETIONS

Wildcats

Archer County: Guy J. Scholl 1 C. W. Cahoon, E. J. Ruddell Sur., A-355, potential 10 bbl., pay 945 ft., T.D. 960 ft., *discovery.*

Montague County: Benson Brothers 1 L. M. Staley, Lot 67, Blk. 4, H.&T.C. Sur., 3 mi. S of Ringgold, dry, Caddo 5,692 ft., Simpson 5,918 ft., dolomite 5,975 ft., T.D. 6,039 ft.

Young County: Shell 1 J. W. Bullock, NE NE Sec. 343, T.E.&L. Sur., 7 mi. NW of Newcastle, potential 1,344 bbl., pay 4,748-4,820 ft., acid, T.D. 5,001 ft., P.B. 4,830 ft., *discovery.*

Fields

Burkburnett, Wichita County: Phillips 6 J. W. Donehoo Pan, J. W. Robertson Sur., A-252, T.D. 1,265 ft., gas-input well.

Harrold, Wilbarger County: Big Six 1 A. A. Vermillion, SE SW Sec. 3, Blk. 14, H.&T.C. Sur., pumped 163 bbl., sand 3,260 ft., T.D. 3,304 ft.

K.M.A., Wichita County: Deep Oil Development 27 Munger-A, NE SW Sec. 30, K.W.V.F.L. Sur., flowed 278 bbl. after shot, sandy lime 3,819-95 ft., T.D. 3,895 ft.

F. W. Merrick 3 T. P. Dorris, NW SW Sec. 4, H.T. &B. Sur., A-551, pumped 18 bbl., sand 4,106 ft., T.D. 4,146 ft.

K.M.A.-Ellenburger, Wichita County: Bridwell Oil 1-E Mangold, Lot 34, Mangold subd., P. Castleman Sur., A-35, flowed 2,544 bbl., acid, pay 4,306-45 ft., T.D. 4,345 ft.

Sunray 14-E Mangold, Lot 39, Mangold subd., P. Castleman Sur., A-35, flowed 1,234 bbl. after acid, pay 4,244 ft., T.D. 4,363 ft.

Sunray 16-E Mangold, Lot 37, Mangold subd., P. Castleman Sur., A-35, flowed 1,331 bbl. after acid, pay 4,250 ft., T.D. 4,348 ft.

Markley, Young County: H. B. Street 8 J. W. Jack, NW Sec. 23, Young C.S.L. Sur., A-1284, T.D. 569 ft., input well.

Petrolia, Clay County: Deep Oil Development 1 B. Landrum-A, NW SW Sec. 5, Parker C.S.L. Sur., A-374, dry, T.D. 1,768 ft.

Ragle, Archer County: Reno Oil 18 G. M. Goren, R. D. Newman Sur. A-330, T.D. 1,082 ft., gas-input well.

Scotland, Archer County: Shell 3-C Dickey Coleman-G, Lot 2, Sec. 74, A.T.N.C.L. Sur., flowed 1,568 bbl., pay 5,287 ft., T.D. 5,364 ft.

Sewell, Young County: Cosden 1 W. E. Steele et al-C, gaged 3,000,000 cu. ft. gas, pay 3,888-3,900 ft., acid, T.D. 4,639 ft.

Margay Oil 1 D. Brisco, P. Tackett Sur., A-1255, gaged 15,000,000 cu. ft. gas, pay 3,324 ft., T.D. 3,354 ft.

Thornberry, Clay County: S. H. Walton 8 G. D. Rigsby, Lot 2, W. Wyatt subd., dry, T.D. 230 ft.

Coleman County Wildcat Opens New Gas Field

FORT WORTH, Tex.—Empire Southern Gas Co. has opened gas production 5 miles south of Santa Anna in Coleman County at 1 Carroll Kingsbury, Wharton C.S.L. Survey 495. The test indicated a good gasser at 2,200 ft. after previously having found a show of oil which was not tested. The discovery started a leasing play in the area.

Meantime, in the new Coleman County pool, Anderson-Prichard Oil Corp. 2 Betty J. Mathews, H. Kegan Survey 520, topped the Morris sand at 3,428 ft. and was drilling at 3,570 ft. Anderson-Prichard 1 O. B. Featherson, Section 52, Block 8, G.H.&H. Survey, was waiting on cement. Anderson-Prichard 3 Harris, Section 51, Block 2, G.H. &H. Survey, was drilling at 2,500 ft., and Anzac Oil Corp. spudded 4 Morris, H.T.&B. Survey 74.

WEST CENTRAL TEXAS COMPLETIONS

Wildcats

Callahan County: Ungren & Frazier 1 R. McDonald, Sec. 100, B.B.B.&C. Sur., dry, T.D. 1,541 ft.

A. S. Goodloe 1 Mrs. E. J. Mitchell, Alford Clements Sur., Blk. 1, dry, T.D. 818 ft.

Coleman County: Woodley Petroleum 1 I. M. Thompson, Sec. 2, Blk. 1, H.T.&B. Sur., gaged 3,000,000 cu. ft. gas, R.P. 1,000 lb., sand 2,807-39 ft., T.D. 3,492 ft., P.B. 2,883 ft.

Jones County: T. D. Humphrey 1 T. D. Humphrey, Sec. 36, Blk. 16, T.&P. Sur., dry, T.D. 2,686 ft.

Fields

Cook, Shackelford County: Roeser & Pendleton and Continental 15-A W. I. Cook estate, Sec. 117, E.T. Sur., dry, T.D. 1,795 ft.

Nail, Shackelford County: Hickok & Reynolds 6 J. H. Nail-C, Sec. 133, E.T. Sur., pumped 8 bbl. oil and 10 bbl. water after acid, pay 1,613 ft., T.D. 1,621 ft.

Northeast Novice, Coleman County: H. T. Owens 2 M. L. Coker estate, Sec. 72, Blk. 2, G.H.&H. Sur., flowed 264 bbl. through 2-in. open tubing, sand 3,008 ft., T.D. 3,030 ft.

Wimberly, Jones County: Butler & Horne 3 A. M. Wimberly, Guadalupe Martinez Sur. 137, flowed 82 bbl. in 5 hr. through ¾-in. tubing choke natural, est. 250 bbl., sand 2,225 ft., T.D. 2,234 ft.

APPALACHIAN FIELDS

Chestnut Ridge Deep Test Running Structurally High

PITTSBURGH, Pa. — In Southwest Pennsylvania, a deep well on Chestnut Ridge reached the Onondaga chert and is running fairly high. There was also a fair gas well in Greene County. In West Virginia, an Oriskany test in Wood County appears uncommercial. In Kanawha County, there were additional locations for Big lime oil and good Oriskany wells in Jackson County.

On Chestnut Ridge in South Union Township, Fayette County, Peoples Natural Gas Co. topped the Onondaga chert at 6,544 ft. in 6 Piedmont Coal Co., ran casing to that point and are waiting on the cement to set before deepening. This is slightly lower than 4 Heyn which appears one of the best wells after a sustained test but still among the higher ones structurally.

About 8,000 ft. south of 1 Kirby on this structure, New Penn Development Co., William E. Snee et al are hauling in material for a test on the Fire Tower Warrant of Indian Creek Coal Co. tract. It is located 375 ft. south of the north line and 660 ft. east of the west line. The surface elevation has not been run.

In Maryland, William E. Snee et al have rigged up and are ready to clear out the surface plug in 1 Speicher on the Accident dome in Garrett County. This was a test drilled in 1921 to 5,160 ft. and abandoned short of the lower Devonian

SOUTHWEST PENNSYLVANIA COMPLETIONS

Armstrong County, Wayne Township: Humphries, Stone & McCall 1 W. J. Anderson, 76,000 cu. ft. gas; Murraysville, T.D. 925 ft.

Clarion County, Monroe Township: Owens Illinois Glass Co. 2 David Fox, 160,000 cu. ft. gas; Murraysville sand, T.D. 974 ft.

Porter Township: T. W. Phillips Gas & Oil Co. 4 P. C. Wells, 116,000 cu. ft. gas; Murraysville 893-962 ft., gas 900-905 ft., Hundred-foot 985-1,072 ft., gas 1,002, 1,050-56 ft., Fourth sand 1,364-96 ft., gas 1,375 ft., T.D. 1,494 ft.

Red Bank Township: Owens Illinois Glass Co. 1 C. S. Brown, total gas 35,000 cu. ft., T.D. 3,260 ft.

Greene County, Center Township: Walter Messing et al 1 John Evans, 1,600,000 cu. ft. gas, Big Injun sand 2,227 ft., gas 2,240-42 ft., and 2,314-19 ft.; T.D. 2,326 ft.

Franklin Township: Waynesburg Home Gas Co. 1 Jesse Roberts, 189,000 cu. ft. gas; Bayard 3,138-55 ft., gas 3,150 ft., sand 3,174 ft., gas 3,175 ft., T.D. 3,202 ft.

WEST VIRGINIA

In Steele district, Wood County, Glen W. Roberts et al are drilling through the Oriskany sand in the test on the I. B. Robinson farm which so far appears dry. The Corniferous was topped at 4,720 ft. with the Oriskany sand top not yet reported, but a showing of gas and oil at 4,821-22 ft. There was about ½ gal. of oil an hour with insufficient gas to test. It is drilling at 4,833 ft.

In Union district, Mason County, Godfrey L. Cabot, Inc., topped the Corniferous in the test on the Daniel Matheny farm and have a show of gas at 4,132 ft.

WEST VIRGINIA COMPLETIONS

Boone County, Scott district: Owens, Libby-Owens 36 Allen & Pryor, 77,000 cu. ft. gas from Big lime and Berea; Big lime 1,781-1,959 ft., Injun 1,959-2,040 ft., Berea 2,458-74 ft.; R.P., Big lime, 270 lb., Berea, 380 lb.; T.D. 2,505 ft.

Washington district: South Penn Natural Gas Co. 72 Yawkey-Freeman, 4 bbl. and 103,000 cu. ft. gas; Injun 2,112 ft., Berea 2,606 ft., T.D. 2,648 ft.

Clay County, Pleasants district: Joe Rubin 2 Mary S. Wetherell, 4,000,000 cu. ft. gas after shot in Wier sand.

Gilmer County, DeKalb district: Clem S. Morris 3 W. F. Roberts, 84,000 cu. ft. gas after 10 days cleaning out, Injun 1,965-2,061 ft., gas 1,972-76 ft., and 2,046-61 ft.; first gage 298,000 cu. ft.; T.D. 2,088 ft.

Harrison County, Clay district: Triad Gas Co. 11 George W. Swiger, 6 bbl., Fifty-foot sand, T.D. 2,123 ft.

Lewis County, Freemans Creek district: Hope 8631 M. C. Woofter, 990,000

(Continued on Page 87)

CANADIAN FIELDS

Alberta Drilling Program Gets Under Way

By VICTOR LAURISTON

CHATHAM, Ont.—Crude and natural gasoline production from all Alberta fields for the week ending July 20 averaged 27,648 bbl. daily compared with 27,536 bbl. daily for the previous week and 27,732 bbl. daily for the corresponding week last year. The daily average included 26,732 bbl. of crude and 592 bbl. of natural gasoline from Turner Valley and 324 bbl. of crude from outside fields.

Taber Field

In the Taber field, southern Alberta, Standard of British Columbia 1 Providence, LSD 9, 18-9-16w4, producing from the Sunburst sand around 3,174 ft., reached a top swabbing production around 408 bbl. and is being put on the pump. Standard 2 has been tentatively spotted east and a little north. Hi-Test Petroleum (Calncy) 1, LSD 7, 24-9-17w4, is spudding. This is the first of a program of 5 tests for which contracts have been let to General Petroleums, Ltd., to drill 3,500 ft. or 10 ft. in the Madison lime. This drilling program is estimated to cost $172,800.

Turner Valley Producers

North Turner Valley: Major Oil 7, LSD 7, 8-21-3w5, total depth 8,441 ft., Madison at 7,925 ft., initial production 2,306 bbl. daily, later increasing to 2,339 bbl. through tubing without compressors. Production later pinched back to 800 bbl. pending official tests; gas-oil ratio was below 1,000 cu. ft.

Foothills Oil & Gas 10, LSD 2, 4-21-3w5, total depth 8,352 ft., Madison at 6,619 ft., initial production 1,106 bbl. daily, settling to around 500 bbl.

Major Oils 9, LSD 1, 4-21-3w5, total depth 8,601 ft., Madison at 7,718 ft., gas-oil ratio 1,173 cu. ft., given new allowable of 510 bbl. daily.

Deep Test Drilling

In North Turner Valley, Major Oil 12, LSD 4, 36-21-3w5, is in the Blairmore below 9,350 ft. This is a record depth for the north field, though Okalta Oil 6, on the South Turner Valley west flank, was carried to 10,209 ft. and abandoned after encountering water in the lower lime.

Stoney Reserve Test

On the Stoney Indian Reserve, west of Calgary, Okalta Oils of Calgary has taken over 14,294 acres, including the site of the Sinclair-Morley-Norcon 1 well, which has been standing since 1928 at 1,590 ft.

Ram River Well

On the Ram River-Clearwater structure, near Rocky Mountain House, Ram River Oils 2, LSD 8, 1-37-11w5, bottoming in the Devonian limestone at 4,340 ft., is conducting bailing tests of oil shows around 4,250 ft. Work has been delayed by the heavy rains and the difficulty of hauling equipment over rough country where even bush trails are lacking.

Bruderheim Test

On the Bruderheim-Lamont structure, 37 miles northeast of Edmonton, Clonmel Petroleums 1, LSD 4, 32-55-20w4, encountered additional shows of light crude in coring from 2,695 to 2,707 ft. It is now below 2,964 ft.

Vermilion and Border Fields

In the Vermilion field, eastern Alberta, Borrodaile 5 finished around 1,825 ft. with initial production about 30 bbl. daily.

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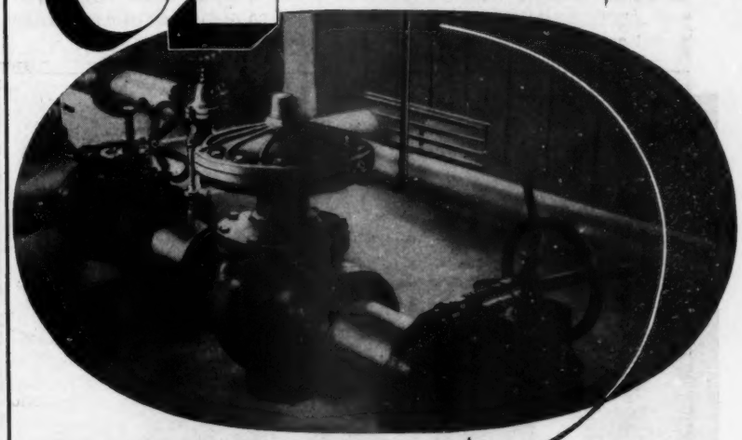

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MICHIGAN OPERATIONS

Widespread Search for New Fields Continues

By OTTO C. PRESSPRICH

SAGINAW, Mich. — Five more small oil wells, four additional gas producers resulted from Michigan operations which also developed eight dry holes. Development increased potential oil production by 323 bbl. a day while the gas potential was raised 10,617,000 cu. ft. a day.

Continued evidence of the search for new fields lay in the fact that seven of the eight dry holes were wildcat tests, including one of the deepest drilling operations in the state this year. That failure was the Franklin Petroleum Development Co. 1 Bonninghousen in Section 8 of Lake Township, Franklin County, abandoned as a dry hole at a depth of 5,080 ft. Another dry hole was drilled below 4,000 ft. in Haring Township, Wexford County, and in Adams of Arenac the Ervin Major 1 White was completed for a scant 8 bbl. a day at a depth of 4,212 ft.

Best of the oil producers was McClanahan Oil Co. 2 Bauman in Section 29, Richfield-Roscommon, completed at 4,190 ft. for 197 bbl. a day after acid treatment. Arenac Oil & Gas Co. 1 Filipek in Section 8 of Deep River-Arenac, gaged 5,880,000 cu. ft. Two tests by Taggart Brothers Co. in Summit Township, Mason County, were given up as dry holes at 800 ft.

With operators getting generally unsatisfactory results from tests drilled below 4,000 ft. in the northern areas of the state, there were indications that more activity will result in the south and southwestern portions of Michigan where production generally has been from levels between 1,200 and 2,000 ft., a condition fitting in with the steel shortage and priorities.

Antco Oil & Gas Co. of Mount Pleasant announced intentions to drill wildcat tests in Sections 25 and 31 of Napoleon Township, Jackson County. Wildcat tests also are planned by Charles W. Teater of Saginaw in Section 24 of Troy Township, Newaygo County, and by C. L. Maguire, Inc., of Mount Pleasant, in Section 30 of Dover Township, Lake County.

Permits for those 3 tests were among 19 issued last week by the state Conservation Department. Bringing total for the year to 330, the list included five locations in Arenac, three in Allegan, two each in Ottawa and Jackson, one each in Bay, Clare, Gladwin, Lake, Montcalm, Newaygo, and Osceola counties.

MICHIGAN COMPLETIONS

Allegan County, Manlius Township: Charles W. Cook 1 Brandt, NE SE SE 21-3n-15w, wildcat, dry, T.D. 1,366 ft.

Arenac County, Adams Township: Ervin Major 1 White, C SE SE 25-18n-3e, pumped 8 bbl., acidized, T.D. 4,212 ft.

Ervin Major 1 Adams Township Land, C NW NE Sec. 36, pumped 71 bbl., acidized, T.D. 4,296 ft.

Deep River Township: Arenac Oil & Gas Co. 1 Filipek et al, C SW 8-19n-4e, 5,880,000 cu. ft. gas, T.D. 1,530 ft.

Branch County, Sherwood Township: McIntyre, Rambadt & Smith 1 Annis, SW SE NW 34-5s-8w, wildcat, dry, T.D. 1,103 ft.

Clare County, Franklin Township: Sun Oil Co. 1 State-Franklin communitized, C N½ W½ NW 4-20n-3w, dry, T.D. 3,352 ft.

Greenwood Township: Sun Oil Co. 1 Amsden, C S½ NW SW 6-19n-5w, 32 bbl. with salt water, acidized, T.D. 3,814 ft.

Winterfield Township: Taggart Bros. Co. 119 Watkins, C NE 18-20n-6w, 1,100,000 cu. ft. gas, T.D. 1,363 ft.

Gratiot County, Lafayette Township: Charles W. Teater 1 Davis, C E½ NE NE 34-11n-1w, wildcat, dry, T.D. 2,686 ft.

Isabella County, Fremont Township: Belvidere Oil Co. 1 Peacock, NW NW NW 27-13n-5w, 837,000 cu. ft. gas, T.D. 1,234 ft.

Mason County, Riverton Township: Taggart Bros. Co. 2 Anthony, C NW 29-17n-17w, wildcat, dry, T.D. 800 ft.

Summit Township: Taggart Bros. Co. 1 Kershener-Anthony et al, C NE 30-17n-17w, wildcat, dry, T.D. 800 ft.

Taggart Bros. Co. 3 Peterson-Pierce et al, C SW Sec. 30, location abandoned.

Missaukee County, Lake Township: Franklin Petroleum Development Co. 1 Bonninghousen, SE SW NE 8-22n-8w, wildcat, dry, T.D. 5,080 ft.

Osceola County, Lincoln Township: Taggart Bros. Co. 38 Johnson-Kremmin, C SE 8-18n-10w, 2,800,000 cu. ft. gas, T.D. 1,201 ft.

Roscommon County, Richfield Township: McClanahan Oil Co. 2 Bauman, C N½ NE NE 29-24n-1w, 197 bbl., acidized, T.D. 4,190 ft.

Van Buren County, Bloomingdale Township: C. C. Goff 3 Galicki, C SE NW 13-1s-14w, pumped 15 bbl., acidized, T.D. 1,295 ft.

Earl G. Hartman 1 Treend, NE NE NW Sec. 12, location abandoned.

Wexford County, Haring Township: Charles W. Teater 1 McNitt, C S½ SW SE 22-22n-9w, wildcat, dry, T.D. 4,010 ft.

Canadian Fields

(Continued from Page 75)

In the Ross Lake area, southern Alberta, Standard of British Columbia is completing a seismographic survey, and will likely begin a commercial well next month under its agreement with the E. L. Cord-Western Drilling interests. In the Twin River area, Paragon Oil Co. is cleaning out and redrilling the old Nordon-Roney well below 3,700 ft., close to the former producing horizon in the top of the Madison.

Quaich Oil Prospect

A Vancouver syndicate is arranging to test the small structure in the southern Alberta foothills known as the Quaich. The potential oil area, a block of 2,480 acres in Township 9-3-w5, east of the Livingstone Range and drained by the upper waters of Todd Creek, lies 18 miles from Lundbreck.

Saskatchewan Operations

On the Little Pine structure in western Saskatchewan, Paynton Oils 1, LSD 13, 29-46-20w3, was abandoned after testing the Devonian at 2,165 ft. Equipment is being moved to Franco Oils LSD 8, 14-39-23w3.

Dutton Field

In Dunwich Township, Elgin County, Ontario, Empire Oil Royalties has resumed its work on the reconditioning of abandoned wells in the old Dutton shallow field. National Oil Well Contractors has the contract. The wells were abandoned years ago as a result of water intrusion and falling production.

LEGAL

United States Department of the Interior, District Land Office, Salt Lake City, Utah. Notice is hereby given that the lands herein described within the known geologic structure of the Cisco Dome Gas Field, Utah, are offered to qualified bidders of the highest amounts offered per acre as a bonus for the privilege of leasing the land under Section 17 of the leasing act, as amended by the act of August 21, 1935 (49 Stat. 674; 30 U.S.C. 226) at a sale to be held in the United States Land Office at Salt Lake City, Utah, at 10:00 o'clock a.m., August 12, 1942, in the following units: Parcel No. 1, T. 20 S., R. 21 E., sec. 1, lot 4, S½NW¼, SW¼, NW¼SE¼, S½SE¼, sec. 12, NW¼; Parcel No. 2, T. 20 S., R. 21 E., sec. 3, lots 1, 2, S½NE¼, SE¼ sec. 10, E½; Parcel No. 3, T. 20 S., R. 21 E., sec. 3, lots 3, 4, S½NW¼, SW¼, sec. 10, W½; Parcel No. 4, T. 20 S., R. 21 E., sec. 4, SE¼NE¼, NE¼SE¼, S½SE¼; sec. 9, E½; Parcel No. 5, T. 20 S., R. 21 E., sec. 11, all; Parcel No. 6, T. 20 S., R. 21 E., sec. 12, NE¼, S½; T. 20 S., R. 22 E., sec. 7, lots 2, 3, 4, SE¼SW¼; Parcel No. 7, T 20 S., R. 22 E., sec. 18, lots 1, 2, 3, 4, SW¼NE¼, E½NW¼, E½SW¼, NW¼SE¼, S½SE¼, sec. 19, lots 1, 2, E½NW¼; Parcel No. 8, T. 20 S., R. 21 E., sec. 13, all; Parcel No. 9, T. 20 S., R. 21 E., sec. 14, N½, NW¼ SW¼, S½SW¼, SE¼; Parcel No. 10, T. 20 S., R. 21 E., sec. 15, all; Parcel No. 11, T. 20 S., R. 21 E., sec. 21, E½NE¼, sec. 22, N½, N½SW¼, SE¼; Parcel No. 12, T. 20 S., R. 21 E., sec. 23, all; Parcel No. 13, T. 20 S., R. 21 E., sec. 24, all; Parcel No. 14, T. 20 S., R. 22 E., sec. 19, lots 3, 4, NE¼, E½SW¼, sec. 20, NW¼NW¼, S½NW¼; Parcel No. 15, T. 20 S., R. 22 E., sec. 20, W½SE¼, sec. 29, E½; Parcel No. 16, T. 20 S., R. 22 E., sec. 20, SW¼, sec. 29, W½; Parcel No. 17, T. 20 S., R. 22 E., sec. 30, lots 1, 2, 3, 4, E½, E½W½; Parcel No. 18, T. 20 S., R. 21 E., sec. 25, all; Parcel No. 19, T. 20 S., R. 21 E., sec. 22, SE¼SW¼, sec. 26, N½, N½SE¼, SE¼SE¼, sec. 27, N½NE¼, SE¼NE¼; Parcel No. 20, T. 20 S., R. 22 E., sec. 31, lots 1, 2, 3, E½, E½NW¼, NE¼ SW¼; T. 21 S., R. 22 E., sec. 5, NW¼NW¼ (unsurveyed), sec. 6, NE¼ NE¼ (unsurveyed). Each lease will be made subject to the unit plan for the Cisco Dome Unit Area, Utah, approved June 6, 1942. Mimeographed copies of the plan will be available for distribution to parties interested in bidding at the local land office in Salt Lake City, Utah, and offices of the oil and gas leasing division, Geological Survey at Salt Lake City, Utah, Casper, Wyoming, and Washington, D. C. Upon acceptance by the Secretary of the Interior of any bid for the unsurveyed tracts they will be surveyed at Government expense. Each successful bidder must deposit on date of sale with the officer in charge of the sale a certified check on a solvent bank or cash for one-fifth of the amount bid by him and file a showing of qualifications to receive a lease as required by section 7 of circular 1386. The remainder of the bonus bid and annual rental must be paid prior to the issuance of the lease. Bids may be submitted for two or more parcels regardless of the acreage involved since each lease will be made subject to and operated under a prescribed unit plan of development and operation. Bidders are warned against violation of section 59, United States Criminal Code, approved March 4, 1909, prohibiting unlawful combination or intimidation of bidders. The right is reserved to reject any and all bids in the discretion of the Secretary of the Interior. Register.

A COMMON NAIL HAS JUST SAVED VALUABLE PUMP PARTS

Here's an action picture of just what happens when slush pump pressure reaches the shear stress in an Abercrombie SHEAR-RELIEF VALVE. The nail shears, the valve piston moves out of path of flow, and pressure is harmlessly released through the valve outlet. Result: another pump . . more vital steel . . has been saved. Cost: a common nail.

FLUID-PISTON SLUSH PUMPS
ABERCROMBIE PUMP CO.
Gulf Bldg. Houston, Tex.

SHEAR-RELIEF VALVE

Flush Producer Extends Embar Ordovician Pool Northwest

By ROBERT INGRAM

MIDLAND, Tex. — A second flush producer which extends the Embar Ordovician pool of Andrews County ½ mile northwest was brought in last week at Phillips Petroleum Co. 4 University-Andrews, SE NW Section 30, Block 10, University Survey. The well flowed an estimated 125 bbl. of oil on a drill-stem test at 7,755-7,860 ft.

The test was made with tool open 41 minutes. The well showed gas in 6 minutes and flowed oil in 26 minutes at the estimated rate of 125 bbl. an hour. Five and one-half inch casing was set at 7,803 ft. after the test was made and plug was drilled at week's end after which clear water was circulated. Operator then pulled tubing to begin a swab test.

A third well was also showing for a producer—Phillips 3 University-Andrews, Section 31, Block 10, a southwest offset to the discovery well. On a drill-stem test at 7,753-7,836 ft., 270 ft. of mud and 900 ft. of mud heavily cut with oil and gas was recovered in 1 hour. At week's end it was preparing to drill ahead after reaming down to 7,864 ft. in cherty dolomite.

These were the only Ordovican tests in the district nearing completion, but several others were drilling. Meantime, Mascho Oil Co. of Midland, Tex., staked a new wildcat operation to test the Permian section 4½ miles southwest of the Means pool, 2½ miles southeast of Shafter Lake, and 3 miles northwest of the town of Andrews. It is 1 Mrs. A. C. Means, NW SE Section 23, Block A-36, P.S.L. Survey.

Stanolind Oil & Gas Co. 1-W University, an 8,300-ft. Ordovician outpost to the north of the Embar area in SW NW Section 19, Block 10, had set 9⅝-in. casing at 4,034 ft., and about 10 miles northwest, Atlantic 1-A Texu, Section 9, Block 12, was drilling below 8,364 ft. in lime and shale. On the southwest edge of the Fullerton area, Fullerton Oil Co. 1-B Wilson, Section 20, Block A-37, P.S.L. Survey, was drilling below 6,400 ft. in lime.

Wildcat Progress

J. R. Sharp 1 Ira Elliott, Section 33, Block D-5, E.L.&R. Survey, scheduled 6,400-ft. wildcat in the Shallowater district of northwestern Lubbock County, was drilling below 2,575 ft. in anhydrite and red rock. In Martin County, Magnolia Petroleum Co. 1 E. B. Powell, Section 18, Block 35, Township 1n, T.&P. Survey, 7,700-ft. wildcat, 8 miles north of Stanton, was drilling below 6,985 ft. in black lime; Amon G. Carter 1 Walter Claer, Labor 22, League 263, Kent C.S.L. Survey, in the northwestern part of the county, was drilling below 4,680 ft. in lime. In Gaines County, hole was being made below 7,100 ft. at the Texas Co. 1 J. Bay Robertson, Section 25, Block A-21, P.S.L. Survey, a scheduled 8,000-ft. Ordovician test.

NORTHERN WEST TEXAS COMPLETIONS

Wildcats

Andrews County: Humble 1 Simms et al, NW NE Sec. 24, Blk. A-29, P.S.L. Sur., elev. 3,495 ft., dry, anhydrite 1,620 ft., San Andres 4,380 ft., San Angelo 5,670 ft., Clear Fork 6,130 ft., T.D. 9,438 ft.

Gaines County: Argo 1 H. B. Granberry, NW NW Sec. 4, Blk. A-9, P.S.L. Sur., 8 mi. NE of Hobbs, dry, anhydrite 2,270 ft., Yates sand 3,500 ft., Yoakum brown lime 4,620 ft., solid lime 5,350 ft., T.D. 5,508 ft.

Fields

Cedar Lake, Gaines County: Stanolind 13 American Warehouse, SE NE Sec. 5, Blk. H, D.&W. Sur., elev. 3,034 ft., swabbed 607 bbl., shot, pay 4,578 ft., T.D. 4,740 ft.

Dodge-Denman, Howard County: Fleming Oil 2-C Denman, NW SE Sec. 16, Blk. 30, Twp. 1s, T.&P. Sur., elev. 2,298 ft., pumped 204 bbl. after acid, pay 2,631 ft., T.D. 2,750 ft.

Ray Oil W. R. Read, SE SE Sec. 37, Blk. 30, Twp. 1n, T.&P. Sur., 1 mi. W and slightly N of Iatan townsite, pumped 222 bbl. after acid and shot, pay 2,634 ft., T.D. 2,884 ft., P.B. 2,750 ft., *extends pool 1 mile north.*

Sharon Ridge, Mitchell County: F. W. Merrick 2-B Strain, elev. 2,153 ft., pumped 88 bbl. after shot, pay 1,540 ft., T.D. 1,690 ft.

Slaughter, Cochran County: Anderson-Prichard 2 Dean, Lge. 58, Martin C.S.L. Sur., elev. 3,683 ft., flowed 907 bbl. through casing after acid, pay 4,907 ft., T.D. 4,988 ft.

Magnolia 4-H Mallett, SW NW Lab. 2, Lge. 53, Scurry C.S.L. Sur., elev. 3,645 ft., flowed 135 bbl. through tubing after acid, pay 5,000 ft., T.D. 5,060 ft.

Magnolia 30 Woodley, NW NW Lab. 9, Lge. 57, Oldham C.S.L. Sur., elev. 3,661 ft., flowed 544 bbl. through tubing after acid, pay 4,913 ft., T.D. 4,965 ft.

Wasson, Gaines County: Amon G. Carter 2 Sharp, NE SW Sec. 47, Blk. AX, P.S.L. Sur., elev. 3,537 ft., flowed 535 bbl. through 2½-in. tubing choke after acid, pay 4,865 ft., T.D. 4,957 ft.

West Andrews, Andrews County: Atlantic 1-B University, SE NW Sec. 13, Blk. 11, University Sur., elev. 3,299 ft., flowed 189 bbl. oil plus 4 per cent b.s. and w. through tubing after shot, pay 4,277 ft., T.D. 4,367 ft.

Skelly 1-H University, NW NW Sec. 14, Blk. 10, Univ. Sur., ¾ mi. S of Siemoneit 1 University, elev. 3,212 ft., pumped 76 bbl. after acid, anhydrite 1,770 ft., brown lime 4,040 ft., gray lime 4,220 ft., pay 4,405 ft., T.D. 4,640 ft.

Second Chancellor Completion Has Large Flow From Castile

Pure Oil Co. 1 Paul Legros, Section 36, Block 50, Township 10, T.&P. Survey, second well in the Chancellor pool of Pecos County which also opened the first production in the Delaware basin from the lower Castile, made a big well on potential gage last week. It flowed an estimated 800 bbl. in 24 hours after running 2-in. tubing with packer. Gas was rated at 250,000 cu. ft. daily. After this gage, the well was shut in due to filled storage.

It was bottomed at 5,072 ft. in the lower Castile as compared to a plugged-back depth of 5,080 ft. at the discovery well, a Delaware sand producer.

Pure also was rigging spudder for 1 H. T. Odneal, NW NW Section 42, Block 49, south offset to the discovery.

Two other wells were being watched in the Fort Stockton area: Some 30 miles southeast of Fort Stockton, Phillips 1 Price was rigging rotary in Section 11, Block 101, T.C. Survey, and 13 miles north of Fort Stockton, Magnolia Petroleum Co. 1 Alan Robertson, Section 16, Block 142, T.& S.L. Survey, lost returns at 3,633 ft., ran 30 sacks of cement, lost the cement, tried again, and was waiting for the second run to harden.

Crane County Wildcat Gets Stain

Magnolia Petroleum Co. 1 D. K. Glenn, Section 20, Block 1 H.&T.C. Survey, wildcat in southwest Crane County which was reported some weeks ago as running structurally high, seemed due to disappoint early in the week when a drill-stem test at 5,287-5,305 ft. recovered sulfur water with only a rainbow of oil. Later in the week, however, the well had slight porosity and staining at 5,340-45 ft. and good porosity and staining at 5,345-50 ft. Hole was carried to 5,370 ft. in dolomite, and a drill-stem test was tried with seat at 5,340 ft. Packer failed on this test and at week's end operators were trying again.

Meantime, another structurally high well was drilling in the northeast corner of the county—the Texas Co. 1 Frazier, Section 19, Block 42, Township 4s, T.&P. Survey. At week's end it had been shut down for orders at 4,799 ft. in lime, drilling having been halted with 1,900 ft. of water in the hole.

Skelly Oil Co. 1 Richardson, Section 5, Block 31, H.&T.C. Survey, Ordovician wildcat test in the southeastern part of Crane County, 7 miles north of the Wentz pool, was drilling below 1,205 ft.

Darby Petroleum Co. 2 University, north offset to the discovery of the one-well Darby pool in Ward County, a Reef lime producer, apparently defined the field in that direction as it was completed for a dry hole. However, the firm located 3 University, SW SW Section 19, Block 16, a west offset to the discovery.

Clara Couch Extended

One-half-mile-southeast extension for the Clara Couch (Fort Lancaster) area of western Crockett County, was assured at Harris & Inman 1 W. D. Padgett, Section 17, S. G. White Survey. It swabbed an estimated 150 bbl. of oil per day after treatment with 1,000 gal. of acid, then was given a second acid injection of 2,000 gal. in preparation for a potential test. Total depth was 2,120 ft.

At the same time, however, likelihood that the Clara Couch field might join with the Hoover area to the northeast was lessened by the failure of George Atkins 1 A. C. Hoover, an outpost midway between the two pools.

SOUTHERN WEST TEXAS COMPLETIONS

Wildcats

Crockett County: George Atkins 1 A. C. Hoover, NW SW Sec. 1, Blk. GG, G.C.&S.F. Sur., 1½ mi. NE of Clara Couch pool, elev. 2,360 ft., dry, T.D. 1,970 ft.

Fields

Clara Couch, Crockett County: Humble 1-B Clara Couch, NW SW Sec. 100, Blk. GG, W. M. Brewer Sur., east offset to No. 1, flowed 219 bbl. through ⅞-in. choke, natural, pay 1,850 ft., T.D. 1,917 ft.

Darby, Ward County: Darby 2 University, NE SW Sec. 19, Blk. 16, Univ. Sur., north offset to No. 1 discovery well, elev. 2,637 ft., dry, T.D. 2,868 ft.

Emperor, Winkler County: Skelly 50 Halley, NW SE Sec. 15, Blk. B-11, P.S.L. Sur., elev. 2,766 ft., flowed 455 bbl. through 42/64-in. tubing choke afer shot, anhydrite 960 ft., base salt 2,380 ft., brown lime 2,440 ft., Yates sand 2,550 ft., pay 2,720 ft., T.D. 2,890 ft., *southeast-edge test.*

North Cowden, Ector County: Sinclair Prairie 1-B Mabel Glass, elev. 3,073 ft., flowed 1,583 bbl. through tubing after acid, Yates sand 3,080 ft., Yates frosted grains 3,100 ft., pay 4,600 ft., T.D. 4,725 ft., *northeast-edge test.*

Weiner, Winkler County: J. R. Sharp 2 Halley-Texas, NE NE Sec. 7, Blk. B-11, P.S.L. Sur., elev. 2,804 ft., pumped 51 bbl. oil and 10 bbl. water after shot, anhydrite 770 ft., Rustler lime 952 ft., base salt 2,178 ft., top lime 2,238 ft., pay 3,135 ft., T.D. 3,185 ft., P.B. 3,168 ft.

TEXAS PANHANDLE COMPLETIONS

Carson County: Cities Service 6 J. W. Fields, Sec. 13, Blk. 7, potential 69 bbl., T.D. 3,303 ft.

Skelly 150 Schafer ranch, Sec. 190, Blk. 3, potential 187 bbl. oil, shot 3,274-96 ft., T.D. 3,301 ft.

Gray County: Baldridge Oil 4 M. Davidson, Sec. 86, Blk. B-2, potential 68 bbl., pay 2,935-3,024 ft., T.D. 3,024 ft.

Hutchinson County: Gooden & Parton 4 Hodges, Sec. 14, Blk. X-02, potential 42 bbl., shot 2,938-3,050 ft., T.D. 3,060 ft.

J. M. Huber 5 Bryan, Sec. 2, Blk. M-24, potential 231 bbl. after acid, pay 3,230-50 ft., T.D. 3,255 ft.

Texas 11 S. B. Burnett, Sec. 127, Blk. 5, potential 182 bbl., pay 3,035-3,135 ft., T.D. 3,140 ft.

Sherman County: Hagy et al 1 Coldwater, Sec. 21, Blk. 3-B, gaged 5,600,000 cu. ft. sweet gas after acid, T.D. 3,259 ft.

Hagy et al 1 Sherman, Sec. 44, Blk. 3-B, dry, T.D. 3,380 ft.

SOUTHEAST NEW MEXICO

HOBBS, N. M.—Completions have fallen off in Southeast New Mexico for the past several weeks. In the Square Lake pool of Eddy County, now the most active area in the state, Nay Hightower 3 Grier was completed for 640 bbl. of oil in 24 hours through open tubing set at 3,189 ft., 2 ft. off bottom. It is the pool's largest natural-flowing well.

Square Lake, Eddy County: Nay Hightower 3 Grier, 31-16-31, flowed 640 bbl., pay 3,175 ft., T.D. 3,191 ft. Sanders Bros. 7 Evans, 33-16-30, flowed 73 bbl., pay 2,809-81 ft., shot.

Loco Hills, Eddy County: Harvey Yates 1 Yates-Dunn, 7-18-29, flowed 150 bbl., pay 2,395-2,456 ft., shot.

SOUTHWEST TEXAS

Wilcox Trend Exploration Attracts Interest

By F. L. SINGLETON

CORPUS CHRISTI, Tex. — With field development in the Southwest Texas district greatly curtailed, main interest centered on the wildcat exploration along the Wilcox trend as promise of a new strike was indicated in the Berclair area, Bee County. In addition, important extensions were promised the South Caesar field, Bee County, while additional gas-distillate sands were being uncovered in the Nordheim area, De Witt County.

Two miles west of Berclair in the Thomas Simmons Survey, Bee County, Magnolia 1 E. H. Buckner was showing extremely high gas pressure as it drilled below 10,250 ft. on a projected 11,000-ft. contract which should place the bottom of the hole well into the Wilcox formation. While the top of the section has not been released, the well has been showing high gas pressure since passing the 10,000-ft. horizon. A mud-logging device logged sand at 10,087-90 ft., sandy shale at 10,090-10,100 ft. and sand from 10,100-10,144 ft. The well is located downdip from the South Caesar and West Tuleta fields in which Wilcox production has been opened and a producing well here would extend the scope of the play many miles southward.

After a disappointing start in which outpost wells to production defined the limits of the field south and southeast, the South Caesar field was in the limelight again with the setting of casing in Continental 1 Fox, 2,500 ft. southeast of production. Total depth is 6,620 ft. with casing cemented on bottom. The well is credited with having cored the upper Carrizo-Wilcox pay at 6,479-6,507 ft. and topped the lower pay around 6,578 ft., which carried an oil and gas odor. The well is located about 2,500 ft. northeast of a dry hole drilled by Jay Simmons on the Cotton lease, which cored the sands too low to produce, and is an east offset to Atlantic 1 Cotton, due north of the dry hole and 2,000 ft. southeast of Luling 1-W-B Slick. The Atlantic test is preparing to test, having logged gas in the upper sand at 6,574-89 ft. and sand showing oil in the lower pay at 6,589-6,620 ft. In the meantime, a third producer was added to the structure with the completion of Luling 2-W-B Slick, which is flowing at the rate of 210 bbl. daily through a ⅛-in. choke from perforated casing in the lower sand at 6,220-26 ft. This completion extends production about 1,000 ft. eastward. The showing of these wells bears out early predictions that trend of developments would follow a northeast-southwest direction, and more light will be thrown upon this theory with the drilling of Luling 1-W-C Slick, location for which was made last week about 4,500 ft. to the northeast.

Preparations Under Way to Test Wilcox Well at West Tuleta

Another Wilcox test in the county attracting attention is located in the West Tuleta field, where Mills Bennett and Anderson-Prichard were preparing to drill-stem test 1 Felipe Perez. Shale with thin sand streaks showing gas was logged at 7,574-88 ft., and the drill-stem test was scheduled to be made at 7,588-93 ft. This is the third Wilcox test to be drilled in the field. Both of the previous tests produced gas-distillate from approximately this same depth. The present well is located about 1 mile southwest of production and is reported to be structurally lower than previous development which should improve its chances to produce oil on the downdip flank of the gas cap.

Tide Water 1 Gips, discovery well of the Nordheim field, a recent Wilcox strike in De Witt County, continues to test other sands in the Wilcox formation, and additional sands have already been added to the structure. After flowing distillate and some salt water through perforated casing at 7,376-82 ft., casing was reperforated at 7,368-74 ft., and on a 16-hour drill-stem test the well flowed at the rate of 187 bbl. of 65.8 distillate and 2.4 bbl. of brackish water with an estimated 2,270,000 cu. ft. of gas daily. At the close of the week perforations had been squeezed and additional tests will be made. The well has shown gas-distillate on two other tests at 8,300 ft. and 8,100 ft., and according to an electrical survey there are five other sands to be tested. These were logged as follows: 6,991-7,023 ft., gas sand; 7,023-34 ft., oil sand; 7,105-33 ft., gas sand; 7,174-94 ft., gas sand; 7,363-90 ft., gas sand.

In the Laredo district interest was centered around the recent completion of Fidelity Oil & Royalty Corp. 1-C Sugarland Industries, completed through perforated casing at 3,970-80 ft. for an initial production of 145 bbl. daily through a 3/64-in. choke. The well is located in Porciones 91 and 92, Camargo jurisdiction, about 1 mile north of the Boyle field and about 3 miles northwest of the Rincon field. This is a new sand for the Boyle gield.

SOUTHWEST TEXAS COMPLETIONS
LOWER GULF COAST DISTRICT

Wildcats

Bee County: Smith & Storey 1 McNeill. dry, T.D. 4,130 ft.

Fields

Orange Grove, Jim Wells County: Smith & Mosser 1 Diersing, 2,235,000 cu. ft. gas, perf. casing 3,272-90 ft., T.D. 3,320 ft.

LAREDO DISTRICT

Wildcats

Brooks County: J. Simmons 1 Powers, dry, T.D. 4,375 ft.
Sun 3 Cage, dry, T.D. 7,255 ft.
Duval County: H. Coquat 4-C Southland, dry, T.D. 5,172 ft.
Hiawatha 1 Halff, dry, T.D. 6,505 ft.
Starr County: Sun 1 Guerrere, dry, T.D. 5,211 ft.

Fields

Alta Verde, Brooks County: Bishop & Simmons 1 Powers, dry, T.D. 4,375 ft.
Seven Sisters, Duval County: S. C. Crouch 2 Chernosky, 36 bbl. pumping, sand 2,246-50 ft., T.D. 2,250 ft.

Louisiana Gulf Coast

(Continued from Page 73)

ft. and the base at 10,206 ft. Completion was made by perforating casing at 10,198-10,206 ft. This is in the Marginulina formation and it is several hundred feet deeper than the discovery well completed at approximately 9,000 ft. Additional development is being started by the operator, who has plans to drill several locations.

The 11,000-ft. sand recently opened in the Paradis field, St. Charles Parish, was extended several hundred feet as Texas 26 L. L. and E. Paradis flowed 479 bbl. daily through a $\frac{7}{16}$-in. choke from perforated casing opposite sand at 11,060-82 ft. In the meantime, production was limited to the south with the abandonment of Texas 1 Peyregne, an outpost test which was quit at a total depth of 10,976 ft.

LOUISIANA GULF COAST COMPLETIONS

Wildcats

Assumption Parish: William Helis 1 Dugas-LaBlanc, dry, T.D. 11,128 ft.
St. Tammany Parish: J. E. Stanga 1 Stevenson & Watts, dry, T.D. 1,622 ft.
St. Mary Parish: Danciger 1 Allain, dry, T.D. 4,505 ft.

Fields

Bay St. Elaine, Terrebonne Parish: Texas 5 School Board, dry, T.D. 8,818 ft.
Lake Salvador, St. Charles Parish: Texas 15 State, 210 bbl., 5/32-in. choke, perf. casing 9,554-66 ft., T.D. 11,037 ft.
Paradis, St. Charles Parish: Texas 26 L. L. and E. Paradis, 479 bbl., $\frac{7}{16}$-in. choke, perf. casing 11,060-82 ft., T.D. 11,122 ft.
Texas 1 Peyregne, dry, T.D. 10,976 ft.
Point au Fer, Terrebonne Parish: Texas 1-B State Point au Fer, dry, T.D. 11,147 ft.
Port Barre, St. Landry Parish: Pan American 14 Garland, 2,500,000 cu. ft. gas, perf. casing 7,716-35 ft., T.D. 7,850 ft.
University, East Baton Rouge Parish: William Helis 9-A Duplantier, 140 bbl., 9/64-in. choke, perf. casing 9,717-21 ft., T.D. 10,194 ft.
Venice, Plaquemines Parish: Tide Water 16 Buras Levee district, 267 bbl., 9/64-in. choke, perf. casing 10,750-10,800 ft., T.D. 11,500 ft.
Tide Water 17 Buras Levee district, 357 bbl., 9/64-in. choke, perf. casing 10,400-10,430 ft., T.D. 10,524 ft.
Vinton, Calcasieu Parish: Union 2-G Gray, dry, T.D. 6,300 ft.
West Mermentau, Acadia Parish: H. M. Naylor 2 Acadia Development Co., 121 bbl. distillate, 12 hr., 14/64-in. bottom-hole choke, 20/64-in. tubing choke, perf. casing 10,198-10,206 ft., T.D. 10,581 ft.

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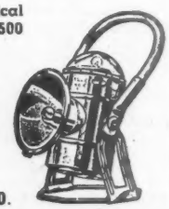

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Oil Insurance, all Classes, nationwide
Loans on Producing Properties
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Langham, Langston & Burnett
Cotton Exchange Bldg. Houston, Texas

Wilcox Found Productive In Lindsborg Field

By CARL HOOT

KANSAS completions continue on a level of approximately 30 a week. Last week 16 oil wells produced 12,094 bbl. initial potential. Four gas wells and 11 dry holes made up the balance of 31 for the week.

The Lindsborg Viola lime pool of McPherson County gained a second pay zone last week when Auto Ordnance Corp. 1 Johnson, CWL SW NE 8-17-3w, found pay in the Wilcox sand at 3,450 ft. and was given state potential of 2,247 bbl. daily. It is on the northern end of the pool and about ½ mile east of the nearest well. This second and deeper pay zone should encourage drilling in the field, which has had several bursts of activity this year. An east offset to the 1 Johnson, by the same company, is already under way.

New production was found in Rooks County, 3 miles southwest of the Laton pool, when Cities Service 1 Dorr, a wildcat in NE NW NE 20-9-16w, swabbed 47 bbl. of oil a day from Lansing-Kansas City lime at 3,218 ft.

North of the Stafford pool Sinclair Prairie 1 Hildebrand, an outpost test in S½ SW NW 11-24-12w, drilled plug to test the Viola lime at 3,850 ft. and was reported to have swabbed some 3 bbl. of oil with 38 bbl. of water.

KANSAS COMPLETIONS

Wildcats

Barton County: Vickers Pet. 1 Prose, SE NE NW 36-17-14w, dry, T.D. 3,410 ft., Lansing 3,133 ft., conglomerate 3,337 ft., Arbuckle 3,379 ft., show oil 3,379-89 ft.

McPherson County: Appleman et al 1-A Bishop, NW SW SE 15-18-1w, dry, T.D. 3,312 ft., Lansing 2,148 ft., Mississippi lime 2,725-2,990 ft., Hunton 3,132 ft., Viola 3,248 ft., some porosity 3,260 ft.

Reno County: Appleman et al 1 Haltom, NE NE SE 6-22-9w, dry, T.D. 3,718 ft., Topeka 2,680 ft., Lansing 3,181 ft., conglomerate 3,466 ft., Kinderhook 3,500 ft., Viola 3,528 ft., Simpson 3,609 ft., Arbuckle 3,668 ft., trace oil in core 3,672-77 ft.

Sedgwick County: Ruso Drlg. et al 1 Puetz, S½ SE NE 1-28-4w, dry, T.D. 4,347 ft., Topeka 2,315 ft., Lansing 2,919 ft., base Kansas City 3,368 ft., Mississippi lime 3,770-4,075 ft., Simpson 4,244 ft., Arbuckle 4,332 ft.

Fields

Ainsworth, Barton County: Continental 1 Johnston-Schreiber, SE NW SW 32-16-13w, dry, T.D. 3,402 ft.

British American 1 Schreiber, SW NW NE 32-16-13w, dry, T.D. 3,424 ft.

Chase, Rice County: Phillips 2 Proffitt, SE NE 8-20-9w, pumped 147 bbl. in 13 hr., Arbuckle 3,246-55 ft.

Coulter, Greenwood County: Johnson et al 1 Coulter, SE SW NW 10-22-13, pumped 15 bbl., Squirrel sand 1,480-1,500 ft.

Davidson, Barton County: H. H. Blair 3-A Peirano, N½ SE NE 4-16-11w, dry, T.D. 3,322 ft.

El Dorado, Butler County: Cities Service 219 Wilson, NE NE 7-25-5, pumped 20 bbl.. Kansas City 2,014-73 ft.

Graber, McPherson County: Continental 3 Meyers, SW SE NW 20-21-1w, pumped 340 bbl., Hunton 3,292-3,326 ft.

Hall-Gurney, Russell County: Coralena Oil 3 Clyde, S½ NW SW 19-14-13w, pumped 72 bbl., Lansing 2,930-52 ft.

Kraft-Prusa, Barton County: Black-Marshall 1 Reimer, NE cor. 25-16-12w, pumped 525 bbl., Arbuckle 3,362-68 ft.

Cities Service 1-C Janssen, NE SE NE 6-17-11w, dry, T.D. 3,421 ft.

Sinclair Prairie 6-E Seyfart, NE NW NE 29-16-11w, 2,246 bbl., Arbuckle 3,295-99 ft.

Shell 1 Disque, NE NW NE 22-17-11w, swabbed 325 bbl. in 4 hr., Arbuckle 3,278-84 ft.

Skelly 1 Zorn, NW NW 31-16-11w, pumped 89 bbl. in 8 hr., Topeka 2,862-2,973 ft., T.D. 3,275 ft.

McLouth, Leavenworth County: Miller & Mosbacher 2 Bell, SW SE 1-10-20, 1,000,000 cu. ft. gas, sand 1,364-1,405 ft.

McLouth. Jefferson County: McLaughlin 1 Miller, SW NE 28-9-20, 4,500,000 cu. ft. gas, sand 1,394-1,415 ft.

B. & A. Drlg. 2 McLouth Bank, SE NW 20-9-20, 1,500,000 cu. ft. gas, sand 1,385-1,425 ft., T.D. 1,452 ft.

Miller et al 1 Edmonda, SE SW 16-9-20, 10,000,000 cu. ft. gas, sand 1,385-1,410 ft.

Peace Creek, Reno County: N. Appleman 1 Graber, SW NE NE 2-23-10w, pumped 267 bbl., Viola 3,689-3,710 ft.

Tide Water 2 Withroder, SW NE NW 1-23-10w, 3,000 bbl., Viola 3,703-15 ft.

Texon Oil & Land 1 Potter, SW NW SE 36-22-10w, dry, T.D. 3,732 ft., Viola 3,679 ft., swabbed 17 bbl. oil at 3,722 ft., acid, swabbed 1 bbl. oil and 1 bbl. water.

Ray, Phillips County: Cities Service 2 Veeh, SW NE NW 31-5-20w, 1,689 bbl., Lamotte 3,638-46 ft., T.D. 3,684 ft.

Cities Service 9 Pinkerton, SW NW SW 29-5-20w, 1,668 bbl., Lamotte 3,619-32 ft.

Silica, Barton County: National Ref. 1 Herter, NE SE 8-20-11w, dry, T.D. 3,335 ft.

Smyres, Rice County: W. C. McBride 2 Hill, NE SE 36-19-6w, pumped 232 bbl., Mississippi lime 3,397-3,434 ft.

Sun City, Barber County: Great Lakes Carbon 1 Freeman, NW SW SE 26-30-15w, dry, T.D. 4,331 ft.

Great Lakes Carbon 1-B Freeman, NW SE SW 26-30-15w, abandoned location.

Trapp, Russell County: Republic Natural Gas 4 Resner, N½ SW SW 23-15-14w, pumped 25 bbl. an hr., Arbuckle 3,302-14 ft.

Phil-Han Oil 2 Karst, NW SE 22-15-14w, 1,434 bbl., Arbuckle 3,324-32 ft.

NEBRASKA

ST. JOSEPH, Mo.—Skelly 1 Mutual Benefit Life Insurance Co. test in E½ SE SE 32-60n-37w, Holt County, Missouri, 4 miles east of Oregon, was a

(Continued on Page 81)

Ohio Fields

(Continued from Page 70)

Noble County, Beaver Township: R. M. Burns 1 John Gallagher, Sec. 3, 30,000 cu. ft. gas, shot, Berea, T.D. 1,552 ft.

Perry County, Bearfield Township: Ohio Fuel 1 Lela Coulter, Sec. 34, 1,400,000 cu. ft. gas, shot, Clinton 3,812-44 ft. and 3,849-54 ft., T.D. 3,867 ft.

Ohio Fuel Gas Co. 1 R. C. Coulter, NE Sec. 34, 1,200,000 cu. ft. gas, Clinton sand, T.D. 3,847 ft.

Clatyon Township: Pure Oil Co. 3 J. A. Pargeon, NW Sec. 7, 100 bbl. and 50,000 cu. ft. gas, Clinton sand, T.D. 3,310 ft.

Thorn Township: Preston Oil 1 Elmer Sivits, Sec. 22, dry, Clinton 2,746-66 ft., T.D. 2,792 ft.

Ohio Fuel 1 W. R. Williams, Sec. 35, 640,000 cu. ft. gas, Clinton 2,715-26 ft., T.D. 2,727 ft.

Summit County, Bath Township: Wiser Oil 1 C. K. Hostetler, Sec. 23, 530,000 cu. ft. gas, shot, Clinton shell, T.D. 3,514 ft.

Wayne County, Plain Township: Mehowa Oil & Gas 2 G. Kean, Sec. 27, 75 bbl., shot, Clinton 3,215-38 ft., T.D. 3,248 ft.

Washington County, Ludlow Township: Dixon & Fogle 1 Clarence Rinard, NW Sec. 31, 10-bbl. pumper. Injun sand, T.D. 1,421 ft.

EASTERN KENTUCKY

ASHLAND, Ky.—Five gas wells were reported completed in eastern Kentucky this week with a combined daily open flow of 599,000 cu. ft. of gas. Drilling activities are moving on the same general trend and no new locations were reported.

EASTERN KENTUCKY COMPLETIONS

Kentucky-West Virginia Gas Co. completions:

679 Floyd Burchett, Sycamore Creek, Pike County, T.D. 3,087 ft., shale, 119,000 cu. ft. gas open flow.

689 Cris Goble, Buffalo Creek, Floyd County, T.D. 2,613 ft., brown shale, 146,000 cu. ft. gas open flow.

5333 James W. Bevins, Slone Branch, Pike County, T.D. 3,852 ft., shale, 103,000 cu. ft. gas open flow.

5401 Calvin Taylor, Raccoon Creek, Pike County, T.D. 3,852 ft., shale, 112,000 cu. ft. gas, open flow.

5402 A. C. Chalres, Raccoon Creek, Pike County, T.D. 3,517 ft., shale, 119,000 cu. ft. gas open flow.

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1. New, 24 lb. pug knife, made of high alloy steel.
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4 and 5. Same type. Each blade coated with 1½ lbs. of COLMONOY. In constant use for over a year, and still going strong.

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ROCKY MOUNTAIN AREA

Location Staked for Test on North McCallum Dome

By T. R. INGRAM

DENVER, Colo.—The Continental Oil Co. has made a location for a well on the North McCallum dome, Jackson County, Colorado, in the vicinity of its famous "ice cream" wells which were under discussion in Washington the past week in connection with the use of dry ice in the production of synthetic rubber. It is stated, however, that the release of the location at this time was coincidental with the Washington development and that there is no connection between the two, the new wells having been planned for some time. The operation is the company's 5 Pollock, NE SW 2-9n-79w, which will be drilled with rotary tools and will test the Frontier, Muddy and Dakota sands to approximately 5,500 ft.

The location is almost 1 mile northwest of 1 Sherman, the discovery well, which came in at 5,110 ft. in the Muddy sand in December 1926, making carbon dioxide gas and high-gravity crude oil. It then was deepened to 5,137 ft. where it made approximately 20,000,000 cu. ft. of gas and 350 bbl. of oil. It again was deepened to 5,147 ft., where it made 30,000,000 cu. ft. of gas and 450 bbl. of oil. Subsequently gas and oil of a similar nature were found to the southeast on the South McCallum dome.

The freakish nature of the well was immediately apparent. The gas was approximately 92 per cent carbon dioxide and came from the well at the surface at a temperature of 110° below zero. The oil (54 gravity) coming with the gas was in the form of frozen slush. During the next few years other wells were drilled and experiments were made to separate the oil from the gas. The most extensive of these was made by the Dry Ice Corp. of America, which constructed a pilot plant to experiment in the separation of the two elements. A satisfactory process was worked out except that the odor of petroleum could not be eliminated from the ice. While this was fundamental in the use of dry ice for the refrigeration of foodstuffs, it is no deterrent in the production of synthetic rubber. In polymerizing butadiene and styrene, coagulation can be hastened by using dry ice for cooling.

Price Increase for Heavy Crude

Action of OPA in authorizing an increase in the price of crude oil produced in the Dallas-Derby and Hudson pools, in Fremont County, Wyoming, from 45 cents to 60 cents per barrel delivered at Lander is looked upon as a favorable sign by producers in other fields who are seeking adjustments of existing differentials. While this particular raise does not set a precedent, it does indicate that the board will give sympathetic consideration to discriminations existing as a result of the establishment of ceiling prices. The ceiling prices are those in effect on October 1, 1941. In some of the Wyoming fields advances amounting to as much as 25 cents a barrel had been posted before October 1, but in others, where there was a slack demand at the time, no changes took place. The 45-cent price in the Lander district was one of those which have remained stationary. The posted price in the Byron field of 55 cents has been in effect since January 1, 1938, and was established when there was an extremely limited demand for that type of crude. The Garland posted price of 45 cents and of 50 cents for Oregon Basin crude have been in effect since June 1, 1941. In the meantime these black-oil districts have become the most active in the territory due to the demands growing out of the war. OPA officials state that on pending applications for increases each one will be considered on its individual merits in relation to the war effort and that the Lander change is not a precedent as to what will be done.

Continental Oil Co. 1 Navajo, deep test 2 miles south of the Rattlesnake field, San Juan County, New Mexico, which encountered a large flow of gas of unusual quality at 6,950 ft., was shut in after killing the gas on instructions from representatives of the Government and tools are being moved away.

WYOMING COMPLETIONS

Lance Creek, Niobrara County: Continental Oil Co. 5 Rodeo-1, SW SE SE 27-36n-65w, T.D. 4,076 ft., swabbed 6 bbl. an hour from the Sundance, will install pump.

Continental Oil Co. 3 Rodeo-2, SW SE SW 26-36n-65w, T.D. 4,115 ft., 8⅝-in. 4,084 ft., swabbed 12 bbl. an hour from Sundance, installing pump.

MONTANA COMPLETIONS

Cut Bank field, Glacier County: Kullberg Oil Co. 2 Tribal-203, SW NE NE 24-32n-6w, T.D. 2,994 ft., Sunburst at 2,890-2,910 ft., dry, Cut Bank 2,942-90 ft., main pay 2,978-90 ft., swabbed 220 bbl., then shot 100 qt., cleaning out.

Glacier Production Co. 4 McDougall, C NW NE 31-34n-5w, T.D. 2,788 ft., 7-in. 2,750 ft., Sunburst 2,685-2,710 ft., show oil 2,696-2,707 ft., Cut Bank 2,720-84 ft., main pay 2,762-84 ft., swabbed 167 bbl., then shot 80 qt. at 2,762-84 ft., cleaning out and swabbing.

Kevin-Sunburst field, Toole County: Hardrock Oil Co. 4 Waite, C SW SE 13-35n-2w, T.D. 1,581 ft., contact 1,538 ft., acid, 1,000 gals., pumped 300 bbl., then 60 bbl. after 3 days.

Hardrock Oil Co. 10-A State, NW NE SW 36-36n-2w, T.D. 1,620 ft., dry in Sunburst at 1,602-20 ft., will use as key well in gas-repressuring system.

Consolidated Gas 2 Hugi, NW NW NW 14-35n-3w, T.D. 1,804 ft., shot with 25 qt., then acid, 750 gal., tested 13 bbl., will acidize again.

Midway district, Toole County: Big West Oil Co. 1 Thiel, SW NW NW 32-35n-4w, T.D. 2,328 ft., show oil in lime break at 2,325-28 ft., failed to respond to acid, P.B. to 2,133 ft. and completed in Cut Bank for 1,000,000 cu. ft.

NORTHWEST NEW MEXICO COMPLETIONS

Rattlesnake district, San Juan County: Continental Oil Co. 1 Navajo, NE NE SW 13-29n-19w, T.D. 6,950 ft., gas killed, well shut in and rig moved away.

Illinois Fields

(Continued from Page 70)

conda 2,462 ft., Barlow 2,583 ft., Benoist 2,754 ft., Renault 2,804 ft., Aux Vases 2,854 ft., Ste. Genevieve 2,908 ft.

Carter 1 W. Davis, NW SW 4-7s-8e, dry at 3,150 ft., Kincaid 1,761 ft., Palestine 2,064 ft., Menard 2,129 ft., Glen Dean 2,387 ft., Golconda 2,496 ft., Cypress sand 2,651 ft., Weiler 2,665 ft., Benoist 2,806 ft., Renault 2,882 ft., Aux Vases sand 2,955 ft., Ste. Genevieve 2,985 ft., McClosky 3,037 ft.

Fields

Bone Gap, Edwards County: Magnolia 1 E. A. Gould, W½ NE NW 7-1s-11e, pumped 60 bbl. oil and 61 bbl. water, perf. 3,247-57 ft., Aux Vases 3,155-88 ft., pay 3,239-59 ft., 3,269-76 ft., T.D. 3,350 ft., P.B. 3,245 ft.

Cities Service 1-C Thread, NW SW 18-1s-11e, pumped 148 bbl. in 20 hr., perf. 3,182-87 ft., 300 gal. acid, McClosky 3,182-88 ft., T.D. 3,202 ft.

Boulder, Clinton County: Texas 3 C. Murphy, SW NW NE 2-2n-2w, pumped 119 bbl. oil and 33 bbl. water in 18 hr., 14-qt. shot 1,205-19 ft., Benoist sand 1,195-99 ft., T.D. 1,220 ft.

Dale, Hamilton County: Carter 1 J. Mayberry, NW SW SW 12-6s-6e, pumped 170 bbl. oil and 8 bbl. water, 60-qt. shot 3,049-68 ft., Aux Vases 3,046-56 ft., 3,060-68 ft., T.D. 3,068 ft.

Shell 7 Beagle, NW SW SW 5-6s-7e, flowed 1,507 bbl., 30-qt. shot 3,006-27 ft., Aux Vases sand 2,986-3,018 ft., T.D. 3,027 ft.

Griffin, Wabash County: Longhorn 37 Helm, SE SE NW 22-3s-14w, pumped 50 bbl., 3,000 gal. acid, McClosky 2,907-13 ft., T.D. 2,920 ft.

Hoodville, Hamilton County: Cameron Bros. 1 Sharp, SW NE 4-6s-6e, dry, old well deepened from 3,144-3,301 ft.

Keensburg, Wabash County: Trans-Tex Prod. Co. 1-A Mussett, SE SW SE 19-2s-13w, pumped 2½ bbl. in 13 hr., natural, Biehl 1,702-13 ft., T.D. 1,713 ft.

Trans-Tex 2-C S. Mussett, NE SW NW 29-2s-13w, pumped 125 bbl., 30-qt. shot on bottom, Weiler 2,451-64 ft., T.D. 2,471 ft.

Louden, Wabash County: Carter 2-5 Doty, SW SW SW NW 2-8n-3e, input well, Glen Dean 1,311 ft., Cypress 1,444 ft., Weiler 1,486 ft., Aux Vases 1,605 ft., perf. 1,483-1,501 ft., T.D. 1,648 ft., P.B. 1,583 ft.

Mill Shoals, White County: W. C. McBride 4 B. Gray, NW NW NE 31-3s-8e, pumped 54 bbl. oil and 2 bbl. water, 20-qt. shot 3,237-49 ft., Aux Vases 3,237 ft., T.D. 3,248 ft.

New Harmony, White County: Sun 4-B Ford, SW NE NE 21-4s-14w, pumped 85 bbl., 274-qt. shot 2,833-65 ft., Aux Vases 2,827-60 ft., T.D. 2,860 ft.

Sun 3-B Ford, SW SE NE 21-4s-14w, pumped 45 bbl., 40-qt. shot 2,851-68 ft., 360-qt. shot 2,851-68 ft., Aux Vases 2,844 ft., pay 2,851-68 ft., T.D. 2,867 ft.

Sun P-B Greathouse, NE SW 33-4s-14w, gas-input well, Weiler 2,571 ft., Benoist 2,687 ft., T.D. 2,727 ft.

Noble, Richland County: Pure 1 Veit Consol., NW NW 26-4n-9e, pumped 18 bbl. oil and 10 bbl. water, 40-qt. shot 2,597-2,609 ft., Cypress sand 2,588-2,610 ft., T.D. 2,624 ft.

North Fairfield, Wayne County: Pure 1-A George Cravens, NE SE 25-1s-6e, pumped and flowed 554 bbl., 5,000 gal. acid, McClosky 3,238-50 ft., 3,251-54 ft., T.D. 3,254 ft.

Olney, Richland County: Texas 1 Hasslinger, SW SE NW 22-4n-10e, dry at 3,146 ft., Menard 2,248 ft., Tar Springs 2,355 ft., Glen Dean 2,456 ft., Cypress 2,631 ft., Benoist 2,843 ft., Aux Vases sand 2,860 ft., Ste. Genevieve 2,982 ft., Rosiclare 3,001 ft., Fredonia 3,030 ft., St. Louis 3,132 ft.

Roland, White County: Kingwood-Sinclair 1 D. P. Hale, SW SW NW 1-7s-8e, pumped 203 bbl., 1,000 gal. acid, McClosky 2,997-3,002 ft., 3,032-37 ft., 3,074-82 ft., T.D. 3,146 ft., P.B. 3,050 ft.

Carter 1 S. Dailey, NE NW 15-7s-8e, pumped 49 bbl., natural, Waltersburg sand 2,211-20 ft., T.D. 2,220 ft.

Carter 1 A. Hill, SE SE 16-7s-8e, pumped 53 bbl., natural, Waltersburg sand 2,180-86 ft., 2,188-93 ft., T.D. 2,193 ft.

Rural Hill, Hamilton County: Texas 1 S. Hunt, SW NW SW 7-6s-6e, pumped and flowed 412 bbl. oil and 15 bbl. water, 60-qt. shot 3,091-3,121 ft., Aux Vases 3,086-3,129 ft., T.D. 3,300 ft.

Russellville, Lawrence County: Ray Phoebus et al 3 Crews, NW NE NE 19-4n-10w, 1,250,000 cu. ft. gas, sand 1,075-95 ft., 1,069-72 ft., pay 1,066-72 ft., T.D. 1,172 ft.

Ste. Marie, Jasper County: Baldwin-Barrett et al 1 Sunderland, E½ SE SW 6-5n-14w, pumped 135 bbl., 5,000 gal. acid, McClosky 2,853-62 ft., 2,861-68 ft., T.D. 2,873 ft.

Sims, Wayne County: Texas 1 T. Dickey, W½ SW SE 20-1s-6e, pumped 160 bbl., 2,000 gal. acid, McClosky 3,170-76 ft., 3,178-87 ft., T.D. 3,195 ft.

N. V. Duncan 1 Witherow-Putnam, NW NE 29-1s-6e, pumped 59 bbl., 1,000 gal. acid, McClosky 3,151 ft., T.D. 3,193 ft.

Texas 3 J. Buchal, W½ SE NE 33-1s-6e, pumped 300 bbl., 3,000 gal. acid, McClosky 3,164-72 ft., 3,174-80 ft., T.D. 3,211 ft.

Texas 2 J. Buchal, W½ NW SE 33-1s-6e, pumped 140 bbl. oil and 20 bbl. water, natural, McClosky 3,192-3,206 ft., 3,211-14 ft., T.D. 3,220 ft.

South Lawrence, Lawrence County: Ryan Oil 1 Schafer, S½ NE NE SW 27-2n-12w, pumped 80 bbl. oil, natural, Benoist 2,010-12 ft., 2,024-26 ft., T.D. 2,026 ft.

W. R. White 1 C. A. Collison, NE SE NW 26-2n-12w, pumped 125 bbl., 60-qt. shot 1,363-88 ft., Biehl 1,363-88 ft., T.D. 1,388 ft.

Storms, White County: Angle et al 1 Aud, SE SW SW 23-6s-9e, 2,000,000 cu. ft. gas and 2 bbl. oil, 20-qt. shot 2,256-66 ft., T.D. 2,271 ft., completed as shut-in gas well.

Oklahoma Fields

(Continued from Page 71)

Maud, Pottawatomie County: Mid-Continent 1 Lovelace, NW NW SE 12-8-4, flowed 240 bbl., Viola 4,310-30 ft., T.D. 4,455 ft.

Pauls Valley, Garvin County: Pure 1 Cashian-Teter, SE SW NE 31-4-1, flowed 30 bbl. an hr., sand 4,090-4,115 ft., T.D. 4,336 ft., P.B. 4,115 ft.

Pure 8 Teter, SE NE NW 31-4-1, flowed 260 bbl., sand 3,834-63 ft., T.D. 4,130 ft., P.B. 3,980 ft.

Texas 1 Patchell, SE cor. 25-4-1w, flowed 3,135 bbl. in 19 hr., sand 3,937 ft. and 4,063 ft., T.D. 4,086 ft.

St. Louis, North, Pottawatomie County: S. K. Vierson 2 Duncan, NE SW SE 21-8-4, flowed 360 bbl., Hunton 3,907-37 ft.

Vernon, Kay County: Fred Morgan 1 Dickerson, SE SE 17-29-1, pumped 90 bbl., Mississippian chat 3,412-48 ft., T.D. 3,450 ft.

Miscellaneous

Creek County: Ernest Schamblin 1 Horoney, SW NE NW 18-17-11, 1,000,000 cu. ft. gas, Bartlesville 1,980-2,090 ft., T.D. 2,808 ft.

Osage County: Charlotte Montgomery, NW NW SE 21-27-8, dry, T.D. 2,325 ft.

NORTH LOUISIANA, ARKANSAS

New Producing Sand in Wilcox Opened in St. John Field

SHREVEPORT, La.—A new producing sand in the middle Wilcox was opened in the recently discovered St. John field, Concordia Parish, with the completion of California 4 Pan American Life Insurance Co., located in 15-9n-10e. Drilled to a total depth of 4,620 ft., and after finding that the discovery pay at 4,550 ft. had shaled out, the hole was plugged back and 7-in. casing was cemented at 3,575 ft. preparatory to testing sand logged by an electrical survey at 3,490-3,520 ft. Casing was perforated at 3,516-22 ft. and on a 6-hour drill-stem test the well flowed at the rate of 200 bbl. of oil daily through a 5/32-in. choke. The well was mudded up and casing was reperforated at 3,482-3,520 ft. and tubing was being run for final completion. While this is only the fourth well to be drilled on the structure, all indications point to a field of considerable size.

In Morehouse Parish Union Producing Co. 1-A Crossett Timber & Development Co., in 6-22n-6e, topped salt formation at 6,952 ft. and drilled salt to a total depth of 6,956 ft. The hole has been plugged back and a test will be made of sand topped at 3,705 ft.

On the north side of the Lisbon field, Claiborne Parish, Union Producing Co. 1-B Meadows, a Smackover lime test located in 13-21n-5w, is flowing at the rate of 189 bbl. of distillate daily through a 9/64-in. choke. Tubing pressure was 3,900 lb. This well topped the Smackover lime at 10,230 ft. and was tested with the hole bottomed at 10,540 ft.

NORTH LOUISIANA COMPLETIONS

Wildcat, Bienville Parish: C. M. Bagley 1 Hutton, SE SE 4-18-7w, dry, Blossom sand 2,790-95 ft.

Haynesville, Claiborne Parish: Ohio 1 Waller P-5, S½ SW SW 2-23-8w, flowed 145 bbl. in 3 hr., Pettit 5,332-54 ft., T.D. 5,477 ft.

Blackwell Oil & Gas 1 Waller-Beene, NE NE 10-23-8w, flowed 264 bbl. in 12 hr., Pettit 5,318-36 ft., T.D. 5,450 ft.

T. L. James 1 Waller, NE NE 11-23-8w, flowed 235 bbl. in 4½ hr., Pettit 5,304-23 ft., T.D. 5,376 ft.

J. B. White 1 Bond, SW NW 21-23-8w, flowed 165 bbl. in 5 hr., Pettit 5,362, 5,394, 5,418-26 ft., T.D. 5,498 ft.

Ohio Oil 2 Waller 3-P, NE SE 3-23-8w, flowed 53 bbl. an hr., Pettit 5,363-85 ft., T.D. 5,490 ft.

Homer, Claiborne Parish: Texas 21-B Shaw, NW SE 25-21-8w, pumped 60 bbl., T.D. 1,984 ft.

Lake St. John, Concordia Parish: California Co. 3 Pan American Life, 15-9-10, flowed 110 bbl., perf. 4,550-77 ft., T.D. 4,587 ft.

Nebo, La Salle Parish: Berishire Oil 5 Ward, 40-7-3, dry, T.D. 4,388 ft.

Lamar & Caroline Hunt 2 Hailey unit, SW SE NW 2-7-3, flowed 265 bbl., perf. 3,609-12 ft., T.D. 4,198 ft.

Pine Island, Caddo County: G. D Juan 1 Muslow, NW SW SE 5-20-15w, flowed 25 bbl., T.D. 2,165 ft., P.B. 1,550 ft.

ARKANSAS COMPLETIONS

Wildcat, Union County: Lion Oil 1 LeCroy, SE NW 36-16-17w, dry, T.D. 6,500 ft., Midway 1,233 ft., Nacatoch sand 1,978 ft., Base Annona 2,340 ft., Travis Peak 3,244 ft., Cotton Valley 4,398 ft., Buckner 6,250 ft., Smackover 6,393 ft.

Dorcheat, Columbia County: G. H. Vaughn 1 Hunt, N½ SW 14-18-22w, flowed 20 bbl. distillate, perf. 8,913-24 ft., T.D. 8,936 ft.

Fouke, Miller County: Carter Oil 9 Sturgis, SE SE NW 1-17-27w, flowed 54 bbl. in 1½ hr., perf. 3,526-40 ft., T.D. 3,890 ft.

Macedonia, Columbia County: Atlantic Ref. 1 Warnock, S½ NW 22-18-21w, flow 22 bbl. distillate an hr., Smackover 8,864 ft., T.D. 8,902 ft.

New London, Union County: Marine Oil 2 Frost Lbr., SW NE 13-18-12w, flowed 97 bbl. in 12 hr., perf. 5,708-20 ft., 5,734-44 ft., T.D. 5,865 ft.

Stephens, Ouachita County: Haynes B. Ownby Drlg. 1 Haltom, SW SE SW 6-15-19w, dry, T.D. 3,558 ft., show oil in sand 3,548-57 ft., water on drill-stem test.

California Fields

(Continued from Page 69)

Water Associated Oil Co. both drilled in this section but both pulled out without going down deep enough. Ralph Lloyd, who has always maintained that the eastern edge would be found productive, took over where Shell and Associated left off and proceeded to complete several flowing wells. North of the Ventura Avenue field, Shell Oil Co. has abandoned 1 Wood on Red Mountain at 5,754 ft. and will quitclaim its leases in that district. Continental's deep test in Piru district of Ventura County on the Ramona anticline is on a pumping test and making about 100 bbl. per day of 23.9-gravity oil. This well has been on a test for the past 10 days but the cut which approximates 50 per cent has not been reduced. Bottom of the hole is in tight oil sand at 5,228 ft. with the effective depth placed at 4,663 ft. by a cement plug. This well looked good during the course of drilling but failed to come up to expectations as the oil sand was too tight to result in flowing production. When the well failed to respond the company put in a pump and has been attempting to reduce the amount of water being produced from the formation. Unless production increases and the amount of water is reduced it is not likely that Continental will undertake any further drilling at least for the present.

Buena Park Wildcat May Be Failure

There was no change in conditions at Buena Park in Orange County this week but the status of 4-1-E Buena Park which the Texas Co. is testing may be decided within another few days. This wildcat, located west of 1 Spencer which Texas completed as a small flowing well, is down 10,044 ft. and has 5½-in. casing cemented at 9,651 ft. It is the present intention to test several showings on the way out of the hole by gun perforating the 5½-in. at predetermined points. This is what was done with the discovery well, 1 Spencer, which was completed in the equivalent to the Bell zone of Pliocene age first found in the Santa Fe Springs field. Structural conditions were found just as anticipated at Buena Park but the oil sand failed to run true to form. It may be possible that the Texas Co. will drill another well close to 1 Spencer although there will not be any rush to do this because of the depth involved. Every indication points to the probability that Buena Park will be very limited.

Drilling Increases At Wilmington

Operators at the Wilmington field are preparing for an all-out drilling program involving the Tar zone, Ranger and upper Terminal zones. Most of the new wells will be drilled to the Tar zone which is unusually productive in the Long Beach Harbor area. Developments during the past week indicate that operators will spread out much of the new work contemplated and for this reason several new wells will be drilled in the so-called Torrance-Wilmington area where the Ranger zone extends over into the Torrance field and overlaps the normal producing zone at Torrance. This only involves the eastern end of the Torrance field, but there are a number of locations available in that district for immediate work. This Torrance-Wilmington section was just coming into its own several months ago when M-68 became effective and forced abandonment of work. Now that this drilling is permissible it is quite likely that there may be several wells started in the immediate future. The area is proved up for Ranger zone wells that are usually capable of pumping around 100 bbl. of heavy crude oil per day from around 3,000 ft.

LOS ANGELES BASIN COMPLETIONS

Buena Park, Orange County: Texas Co. 1-1 Buena Park, 6-4s-10w, dry, T.D. 9,042 ft., perf. 7-in. casing at 8,517 ft.

Carbon Canyon wildcat district, Riverside County: Homer May 1 Oasis, 31-2s-8w, dry, T.D. 751 ft., no shows.

Santa Ana Canyon wildcat district, Orange County: Atlas Oil Co. 1 Santa Ana, 36-3s-9w, dry, T.D. 2,670 ft., no shows.

Nebraska-Missouri

(Continued from Page 79)

dry hole. Total depth was announced as 3,500 ft., but particulars as yet have not been released. The test was drilled on the basis of core hole exploration.

Skelly Oil Co. has two Viola limestone producers in the Dawson pool of Richardson County, Nebraska, both small. No. 1 Smith in E½ SE SE 3-1n-14e is producing 14 to 15 bbl. of oil daily and 1 Wiltse in C E½ NW SE 10-1n-14e is producing 23 to 24 bbl. of oil per day.

Edwin S. Towle 1 Ethel Auxier in E½ SE SE 4-1n-14e, the Dawson pool, was drilling below 1,000 ft.

NEBRASKA COMPLETION

Richardson County: Cities Service 1 Moorehead, SW NE 16-3-16, dry, T.D. 2,705 ft., Lansing 941 ft., Mississippi lime 2,159 ft., Kinderhook 2,367 ft., Hunton 2,595 ft.

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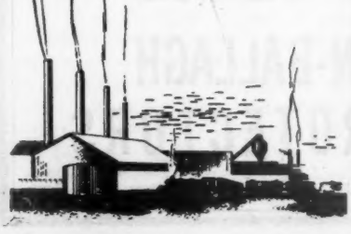
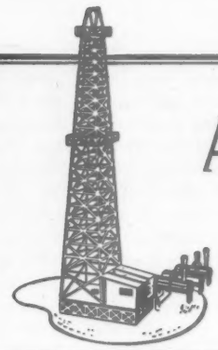




Among the Drilling

Treasury Department Again Forces Attack on Depletion Allowance

DRILLING CONTRACTORS have a vital interest in present regulations permitting the deduction of intangible drilling costs in the calculation of federal income taxes, the American Association of Oilwell Drilling Contractors warns its members in a bulletin. Changes in this law that might force operating oil companies to drill their own wells would undoubtedly destroy the contract drilling industry as it exists today, the bulletin states. "We are definitely opposed to any change in this law, and are convinced that it would be harmful to the oil industry and to the country as a whole. The percentage depletion allowance and intangible drilling costs provisions of the law are so tied together that the Government apparently is trying at one stroke to eliminate both."

This warning is timely in that recently Secretary of the Treasury Henry Morgenthau, Jr., launched another attack on the oil-depletion allowance in the revenue law, as the Senate finance committee began consideration of the 1942 revenue bill, which has passed the House.

The Treasury had sought changes in the depletion allowance when the bill was being framed by the House committee on ways and means, but after extensive hearings that committee voted to make no changes in existing provisions. Mr. Morgenthau did not refer to this when he appeared before the Senate committee but in discussing what he called special privileges in the revenue laws, he said:

"I cannot believe that the tax payers of America would knowingly sanction a provision of the law which allows owners of oil and gas wells to deduct from their income 27½ per cent of their gross receipts from such wells—not for 1 year, 2 years, or the period necessary to return investment, but for an unlimited period. For example, a leading oil company owned a number of oil properties which had cost it $3,000,000. At the time the case was examined percentage depletion of $3,600,000 had already been allowed and the properties still had three-fourths of the oil left.

"Certainly we cannot justify this exemption on the ground that it encourages exploration and drilling for oil. There is grave doubt that it has a substantial effect on oil discovery. It would have cost the federal Government about one-third as much to have paid all the cost of every wildcat well that was drilled in 1941 as to have allowed percentage depletion and the associated intangible drilling expenses. The annual cost of these allowances under the proposed rates would be about $200,000,000."

" . . . These examples of special privileges are intolerable at a time like this, when we are imposing heavy taxes on persons with small incomes and there is pressure for limiting wages and farm prices. The country is in greater danger today than ever before in its history. The war is now in its most critical phase, and only by pulling together as a united people can we make the effort that will turn the tide toward victory. At such a time any special privilege for any group not only deprives the Treasury of revenue that is badly needed for the war effort, but it hinders the war effort by undermining the morale without which the war cannot be won."

●

A. Z. SKEETER, Kilgore, Tex., is doing the drilling on Imperial Petroleum Co. 1 Anna Hanson, Stephen English Survey, Shelby County, Texas.

CROSS & JOHNSON have the contract to drill a 4,600-ft. wildcat in Andrews County, Texas. The test is nearly 5 miles southwest of the Means field, and is Mascho Oil Co. 1 Mrs. A. C. Means, 1,980 ft. from the south and east lines of Section 23, Block 36, P.S.L. Survey.

BUTLER & HORNE Drilling Co., Dallas, Tex., is to start immediately on a 2,700-ft. cable-tool test 12 miles northwest of Abilene, in Taylor County, Texas. It is the 1 S. M. Redden, 780 ft. from the west and 330 ft. from the south lines of Section 25, Block 17, T.&P. Survey.

LIMA Drilling Co. has the contract to drill Mogue Oil Co. 1 Maurice H. Hanggi, C SW SE 35-19n-3e, Arenac County, Michigan. The contractor will also drill Mogul Oil 1 Margaret Lusher, C SE NW 35-19n-3e, in the same county.

OILWELL Drilling Co. has been awarded contract to drill 1 State of Michigan for Henry L. McEvoy, Joseph Zucker, Ralph M. Zerbey and George Henry Flynn, of Detroit. The well is in C W½ SW SE 12-19n-1e, Gladwin County, Michigan.

FAIN Drilling Co., Houston, Tex., is moving a rotary to Matagorda County, Texas, 5 miles northeast of Collegepoint, for the company's 1 Richman. The well is located on acreage farmed out by Stanolind Oil & Gas Co., and present plans call for the drilling of two tests.

FALCON-SEABOARD Drilling Co. has the contract and an interest in the well, in Lario Oil & Gas Co. 1

Crew of Harper & Turner, in the East Edmond field, Oklahoma. Jess George, driller; F. H. Cook, welder; J. L. Potts, derrick man; Wilson Grayson, pipe racker; W. A. Wilson, backup man, and V. M. Byerly, motorman

Contractors

Neilson, NW NW 28-11-6w, southeast of the Bemis pool, Ellis County, Kansas, which was starting last week. Falcon-Seaboard and Anderson-Prichard were starting at the 1 Lork, SW SW 12-27-4w, 5 miles southeast of the Hilger pool, in Sedgwick County, Kansas.

BREWSTER-BARTLE Drilling Co., Houston, Tex., is attempting to open production from a higher sand in Ohio 1 McDonald, the discovery well of a new field north of Bay City, Matagorda County, Texas. Final completion is expected to be around 7,800 ft., where drill-stem testing recovered pipe-line oil.

SUMMITT Drilling Co., Tulsa, has been awarded contract for O. M. Mason et al 1 Bunch, SE NE NE 8-24n-3e, near Ford in northeast tip of Noble County, Oklahoma. Contract is for 4,000 ft., or the Wilcox sand. Location is on a 1,300-acre block and is being supported by Atlantic Refining Co., Barnsdall Oil Co., Papoose Oil Co., and Johnson Oil Refining Co.

FAIN Drilling Co., drilling Ray P. Diehl et al 1 Cissna, SE NW SE 27-15-3w, near Seward, Logan County, Oklahoma, was drilling at 4,623 ft. in lime.

ROWAN & HOPE, San Antonio, Tex., are starting another wildcat operation in Jackson County, Texas, 3 miles northeast of the Cordelle field. The well is a projected 4,750-ft. test.

J. A. GRAY, Houston, Tex., is moving a rotary 2 miles northwest of Navidad for 1 Rose & Sample, a Frio sand test located in the E. B. Hill Survey, Jackson County, Texas.

ALLEN & MORRIS, San Antonio, Tex., received contract for a 7,500-ft. Wilcox test to be drilled in the old Pettus field, Bee County, Texas. The well will be drilled for Union Producing Co. and is located on the George A. Ray lease.

BIG CHIEF Drilling Co. has contracts on three tests in Lucien field, Noble County, Oklahoma, being drilled by Danciger Oil & Refining Co. Hole was started under surface pipe at 1 Plummer, C SE NE 5-20n-2w; 1 Chadwell, C SW NW 4-20-2w; and 2 Inselman, C NW SE 5-20-2w.

O. W. DYER, Houston, Tex., was attempting to extend production in the South Caesar field, Bee County, Texas, as testing was under way in Atlantic 1 Cotton, about 2,000 ft. southeast of production. Total depth is just below 6,600 ft. Other operations are reported for the same company in the Neale field, Beauregard Parish, Louisiana.

BIG WEST Drilling Co., Dallas, Tex., has contracts for 50 wells to be drilled by J. C. Hawkins, Tyler, Tex., which firm has taken leases on nearly all of the Mallett Land & Cattle Co. lands in Hockley and Cochran counties, West Texas. Locations for 116 wells have been staked. Contracts are for 5,100 ft. on each well, averaging four wells to each labor. The contractor is obliged to keep five rigs running simultaneously.

NICKLOS Drilling Co., Houston, Tex., received contract from Texas Co. for a projected deep test located on the southwest flank of the Pine Prairie dome, Evangeline Parish, Louisiana. The location is a short distance from a recent producer which opened a second producing area for the dome. One rotary is running in the Ville Platte field. Evangeline Parish, for Continental Oil Co., while in the Tepetate field, two operations are reported for the same company.

PETROLEUM WELLS Service Co., Houston, Tex., is starting four new operations in the new Stewart field, Jackson County, Texas, for W. Stewart Boyle, all being located as outposts to the discovery well, completed for an excellent producer the past week at 4,900 ft. However, it is possible that the four wells will be carried deeper in view of the sands logged in the discovery well at deeper depths.

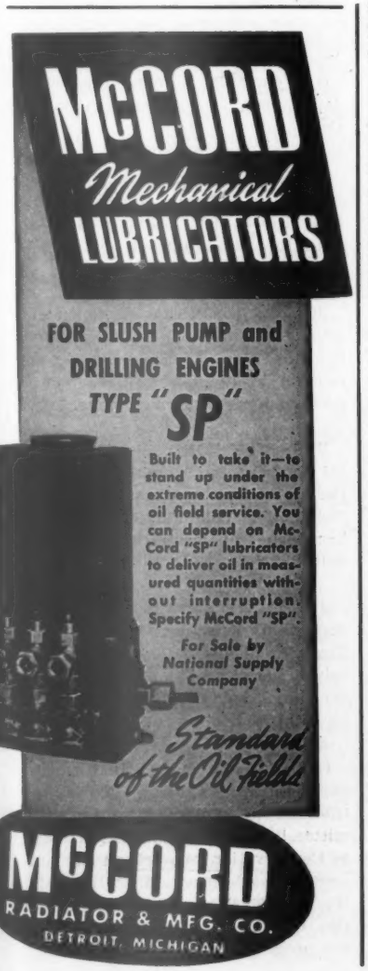
R. P. DORIAN, Wichita Falls, Tex., has the contract for the Hanlon-Buchanan and Standard Oil Co. of Texas 1 Lucille Gowdy-A, Section 2, T.C. Survey A-1888, a 6,200-ft. wildcat 12 miles northeast of Jermyn.

HELMERICH & PAYNE, Tulsa, are contractors for Pure Oil Co. 1 H. T. Odneal, Section 42, Block 49, Township 10, T.&P. Survey, third test in the new Chancellor pool of western Pecos County, Texas, and south offset to the discovery well which opened pay from the Delaware sand. The second well in the pool opened a second pay, the lower Castile, and the area may increase in activity.

PARKER Drilling Co., Tulsa, have the contract for British American 1 O. W. Lemmon, Arthur Roberson Survey, a wildcat 2 miles northwest of Lodi, Tex., and 3 miles west of the new Kildare field.

F. B. PAINE, Dallas, Tex., has the contract for Hanlon-Buchanan and Standard Oil Co. of Texas 1 J. W. Daws, Section 751, T.E.L. Survey, a Mississippian lime wildcat in extreme western Young County, Texas.

Nine rigs were running last week in the new Black Oak pool of Wood County, Texas — two operated by Parker Drilling Co., Tulsa; one (Amerada 1 Mrs. J. M. Robertson) by Two States Drilling Co.; one (Amerada 5 Kennemer) by Noble Drilling Co., Tulsa; one for General American Oil Co. by Roger Lacy, Longview, Tex.; one by Jerry Hawkins, Tyler, on his own well, and three company rigs operated by the Magnolia Petroleum Co.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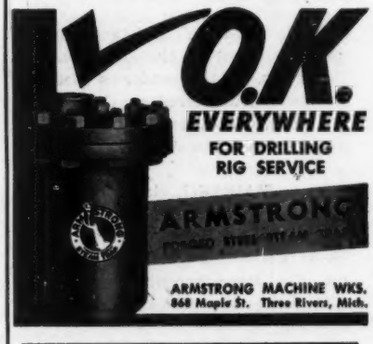

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The Oil and Gas Journal

Personal Paragraphs

NORTH BIGBEE, in charge of public relations for the Texas division of the Mid-Continent Oil and Gas Association, has been commissioned a first lieutenant in the Air Corps and reported for active duty last week in Florida.

E. G. DAHLGREN, executive secretary of the Research and Coordinating Committee of the Interstate Oil Compact Commission, attended a hearing of the Michigan Department of Conservation at Lansing, Mich., Tuesday. He will return to the Oklahoma City headquarters of the compact Saturday.

T. W. McSPADDEN, drilling and production engineer with Delta Drilling Co., Tyler, Tex., has resigned to enter the U. S. Army Air Corps.

J. M. HAMILL, paleontologist with the producing department of Texas Co. in California, is recovering from a recent operation and should be back on the job again shortly.

VERNON I. LAY, district chief clerk for Humble Oil & Refining Co. in the Tomball, Tex., gasoline plant, has been transferred to the company's Katy gas-recycling plant.

COL. GEORGE A. HILL, JR., president of Houston Oil Co. of Texas, Houston, Tex., left last week for an extended vacation trip through Mexico.

R. R. McCARTY, assistant district superintendent for Humble Oil & Refining Co. in the Andrews district, has been transferred to the Chalkley district in coastal Louisiana as district superintendent.

W. L. MARCONI, vice president in charge of sales in the northern division; T. L. LIPPS, secretary, and H. M. CRAVEN, treasurer, of Caminol Co., were recently elected to their respective offices at the annual meeting.

F. E. SEAVER, secretary of Southern California Gas Co., Los Angeles, Calif., retired August 1, leaving behind him a record of 35 years in Southern California Gas and predecessor companies. Mr. Seaver began as a bookkeeper, and in 10 years had risen to superintendent of the Los Angeles office. He became secretary in 1938. R. R. BLACKBURN has been elected to succeed Mr. Seaver.

LT. ROY L. CALLOWAY, of the southern division of Mid-Continent Petroleum Corp., at Tulsa, was honored for gallantry in action by being awarded the Purple Heart, one of the highest Army awards. He was a member of a bomber crew which had to make a crash landing on its home field after participating in an air assault on the Jap held island of New Guinea. During the attack the plane on which Lieutenant Calloway was bombardier shot down four Japanese aircraft.

DR. R. H. WASER, manager of the Shell Oil Co., Inc., refinery at Houston, Tex., recently celebrated his twenty-fifth year with the Shell organization. He began his career as a chemist, and came to the United States and took out citizenship papers 23 years ago.

C. C. VIRGIN, Oklahoma land man for Texas Co. for the past several years, has left Tulsa for Mattoon, Ill., to assume the duties of district land man for the company, in charge of land matters in that area. Mr. Virgin has been associated with the company for 21 years. He will succeed W. A. MARTIN, who will be transferred to Tulsa as division land man. Mr. Martin's service with the company covers a period of 25 years.

S. R. LENNING, production foreman for Texas Co. in the Jal area of New Mexico, has been presented the President's Medal, life-saving award of the National Safety Council. The presentation was made by C. B. WILLIAMS, manager of Texas Co. with headquarters in Fort Worth, Tex., at a general meeting of foremen in Midland, Tex. The award was in recognition of first aid rendered by Mr. Lenning to EARL S. REED, an employe of a contractor, who was overcome by hydrogen sulfide gas while working on a well in January.

Do You Remember?

From The Oil and Gas Journal Files

35 YEARS AGO

An English company, Anglo-Mexican Oil Field, Ltd., has been organized with a capital stock of $1,250,000, for the purpose of developing oil lands in Mexico.

A list of the vessels owned at Port Arthur, Tex., and enrolled at the customs house there makes the number 46, of which 14 are tugs used in towing oil barges, and 9 are steamers engaged in the oil trade.

Runs from the Glenn field in July are put at 2,635,000 bbl., or 85,000 bbl. per day, and the production up to August 1 is figured at 13,135,000 bbl.

25 YEARS AGO

At Norman, Okla., in the state university, a short course in oil geology was conducted this year, following the close of the regular term. The innovation is considered favorably by the faculty, and amateurs in the oil business are given opportunities to study the rudiments of the science.

Present developments indicate that a large majority of the motors used in America's airplane fighting force will range from 100 to 200 hp., or an average of 150 hp. A writer estimates that a fuel allowance of 0.6 pint of fuel is necessary per hour for each horsepower developed.

The Young Ladies Oil Co. has been organized, with headquarters in Beaumont, Tex., capitalized at $250,000. It is hoped that the venture will be a social and financial success.

10 YEARS AGO

There are now approximately 7,000 producers in the East Texas field. The per well allowable for the field was just given another cut, lowering the daily amount to 44 bbl.

The Texas Railroad Commission has decided to have its engineers gather data in the Panhandle to guide the commission in passing on applications pending the permits to use gas in the production of casinghead gasoline.

ROBERT E. JENNINGS, Dallas, Tex., independent operator, has been commissioned a lieutenant commander in the Navy.

DORIS BLUE has been named as drilling superintendent at Oklahoma City, Okla., for Phillips Petroleum Co., succeeding J. MARK GARDNER, who has gone to the Army.

ROBERT F. GILL, with headquarters at the Texas Co. offices in Caracas, Venezuela, foreign production department, was a recent visitor in California.

ALBERT GIBSON of Petrolia, Ont., formerly a driller in Burma and the East Indies, has taken a position with the Aluminum Co. of Canada at Shipshaw, Que.

JOHN BLAFFER, independent producer and drilling contractor, Houston, Tex., has received a commission in the Coast Guard and is now stationed at New Orleans, La.

S. J. BRADFORD, district electrical foreman for Humble Oil & Refining Co. in the Bayou des Glaise district, Iberville Parish, Louisiana, has been transferred to the Bayou Sale district.

JIM TICHY, scout in the land and geological department at Amarillo, Tex., for Shell Oil Co., Inc., has received his commission as ensign in the Navy, and is expecting a call for either school or duty at any time.

GEORGE VANDAVEER, engineer with Mid-States Oil Corp., Tulsa, has been named on the engineering committee by the Louisiana Department of Conservation to work on the prevent-gas-waste program for the state. W. W. HEARD, of Stanolind Oil & Gas Co., Tulsa, will also assist in the program.

L. L. WALKER, formerly of Mid-Union Drilling Co., is now tool pusher for Helmerich & Payne, Inc., stationed at Great Bend, Kans.

H. M. SHOEMAKER, chief engineer, Forest Oil Co., Bradford, discussed secondary recovery at the meeting last week of the Oil City (Pa.) Rotary Club.

ALLEN J. ANDERSON, tool dresser in the Bradford, Pa., field, is in a Bradford hospital recovering from injuries received in an oil-field accident.

COL. T. H. BARTON, president, Lion Oil Refining Co., El Dorado, Ark., was recently elected a member of the board of trustees of George Peabody School for Teachers, Nashville, Tenn.

W. LLOYD HASELTINE, geologist at Midland, Tex., with the Magnolia Petroleum Co. for the past 5 years, will leave soon for Wichita Falls, Tex., where he will take over the post of district geologist for the company's North Texas area. He will succeed FRED H. MOORE, who has been transferred to Mount Vernon, Ill.

LOYAL H. DAVIS, assistant superintendent of Cities Service Co. natural-gasoline plant at Wichita, Kans., has been called to active service in the Army at Omaha, Neb. He held a second lieutenant's commission in the reserves. Mr. Davies had been with Cities Service since 1929. and has been assistant superintendent of the natural-gasoline plant since 1937.

F. J. SCHEMPF, district geologist for Stanolind Oil & Gas Co. at Midland, Tex., for the past 3 years, will take over the post of division geologist at Fort Worth, Tex., succeeding FRANK H. SCHOUTEN, who will be in charge of Stanolind's geophysical work. W. G. MOXEY, geologist at Midland for more than 5 years, will go to Amarillo, Tex., as district geologist. DAVE HENDERSON, of the Amarillo office, has been transferred to the Midland office as district geologist. He had been located at Amarillo for the past 6 years.

Moves to Houston

The toga of acting chief exploration engineer in the Texas Gulf Coast district for Shell Oil Co., Inc., has been passed to W. A. Schaeffer, who has been transferred to Houston, Tex., from his former position as production assistant to the president's office in New York City.

W. A. SCHAEFFER

Mr. Schaeffer has been closely identified with oil-field engineering throughout his career. He joined the Shell organization, which at that time was Roxana, in June 1926, attached to the St. Louis, Mo., office.

First work in the oil industry was a geological assignment in the Rocky Mountain district during the summer of 1924 for the old Producers & Refiners Corp., Denver, Colo. The next year of his experience was as a geologist for Venezuelan Sun, Ltd., in Venezuela. Returning to this country in the fall of 1925, Mr. Schaeffer accepted a teaching fellowship in geology at Missouri School of Mines, Rolla, Mo., where he had previously taken degrees in science and in mining engineering in 1924.

After a year in the St. Louis office, he was assigned to Shell's Texas organization as an exploitation engineer and was stationed at various times in Coleman, Kilgore, McCamey, and Wink.

Starting in June 1933, he spent 9 months in the production department of the Bataafsche Petroleum Maatschappij, in The Hague, after which he was stationed in Houston for a year as Texas Gulf area production engineer. The next 5 years were spent in the St. Louis office as assistant to the vice president for production. Mr. Schaeffer was transferred to New York in September 1940.

Mr. Schaeffer is a member of the A.I.M.E., Tau Beta Pi, Sigma Nu, and of the Masonic order.

While teaching at M.S.M., Mr. Schaeffer married Josephine Bowen of Rolla. The Schaffer family now includes W. A., III, who is 15, and Carolyn, 10. Among his hobbies are long automobile trips, admittedly cramped at present, and hunting.

A. J. BALCOM, an executive of Magnolia Petroleum Co., has been made a member of the Dallas County rationing board.

R. V. HOLLINGSWORTH, formerly in the Mid-Continent geological office of Shell Oil Co., Inc., is now stationed at Midland, Tex.

J. C. SAUNDERS, Perry, Okla., has returned to the United States, after working in England's one field, for his twentieth smallpox vaccination and a draft registration.

HENRY RAE, exploration geologist for British-American Oil Co., has been placed in charge of a geological department the company has established at Calgary, Alta.

N. R. WHITTALL has been named president and managing director, and A. P. BOWSHER secretary, of Pacific Petroleums, Ltd., operating in the Turner Valley field in Canada.

GILLETTE HILL, independent operator, Houston, Tex., has been commissioned a captain in the Army Air Force and is presently located at Miami Beach, Fla., but is expected to be transferred to the West Coast.

LOT BOWEN, geologist for Western Gulf Oil Co. with offices in Los Angeles, Calif., was recently appointed chairman of a field committee which is preparing data on California drilling costs, especially in the San Joaquin Valley heavy crude-oil fields.

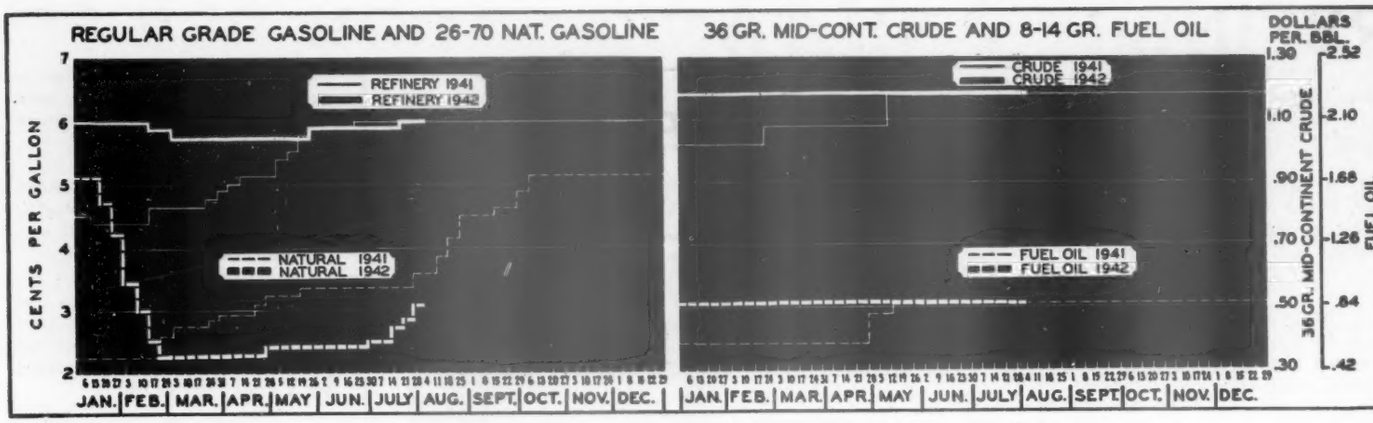
COL. F. M. STEELE of Calgary, Alberta, formerly petroleum engineer for the federal Department of Natural Resources, has been appointed liaison officer with the Canadian Army in connection with the United States activities on the Alaska highway.

GEORGE A. LEE, who has been assistant division superintendent for Humble Pipe Line Co. at Midland, Tex., has left for Longview, Tex., where he will take over as division superintendent, succeeding F. D. McMAHON. Mr. Lee's successor at Midland is JACK C. JONES, who has been district superintendent at Odessa, Tex., for the last 18 months.

Shifts: R. W. HIRSH, engineer, Shell Oil Co., Inc., Pampa, Tex., to Tulsa; W. R. ZWINK, engineer, Cities Service Oil Co., Loup City, Neb., to Tulsa; HAROLD R. SELLS, engineer, Kerlyn Oil Co., Sunray, Tex., to Oklahoma City, Okla.; W. R. REED, superintendent, Sinclair Refining Co., pipe line department, Independence, Kans., to Tulsa; A. L. JOYNER, engineer, Ashland Oil & Refining Co., Oklahoma City, Okla., to El Dorado, Ark.; C. J. HAAS, superintendent, Adams Oil & Gas Co., Centralia to Mount Vernon, Ill.; N. J. LEA, engineer, Texas Co., Merced to Woodland, Calif.; LEON KERNS, engineer, Wiser Oil Co., Edmore, Mich., to Copley, Ohio; J. C. ERSKINE, engineer, Gulf Oil Corp., Drexel Hill, Pa., to Seguin, Tex.; GEORGE MARTIN, superintendent, Barnsdall Oil Co., Victoria, Tex., to Stamps, Ark.; L. SZILY, manager, International Petroleum Co., Tampico, Mexico, to Seaboard Oil Co., Los Angeles, Calif.; HOWARD GRAHAM, superintendent, Tytex Oil Co., Tulsa., to Locust Grove, Okla.; ROBERT E. COUCH, engineer, Texas Co., Oklahoma City, Okla., to Tulsa; HENRY A. JACKSON, engineer, Magnolia Petroleum Co., Eunice to Lovington, N. M.; A. W. REA, superintendent, J. V. Dunbar, Wayne City to Farina, Ill.; W. A. PRESTON, engineer, Dehydro Co., Hutchinson, Kans., to Hobbs, N. M.; G. P. ROSE, engineer, Texas Empire Pipe Line Co., Scammon, Kans., to Fairbury, Ill.; WORTH B. HURT, geologist, Magnolia Petroleum Co., Greenville to Sulphur Springs, Tex.; E. I. HEAD, engineer, Gulf Oil Corp., Fort Stockton to Bowie, Tex.; L. L. MALAISE, Atlantic Pipe Line Co., Longview, Tex., to Merryville, La.

GOULD FITCH, president of El Tejon Refining Co., Mountain View, Calif., has taken a leave of absence from his official duties in order to devote his attention to the Ferry Command with which he will be connected for some time to come. Mr. Fitch is an experienced pilot and will engage in flying activities for the duration.

ERNEST K. PARKS, Los Angeles, Calif., consulting petroleum engineer and at present Pacific Coast chairman of the A.P.I. Division of Production, and Geraldine Kibler, recently private secretary to L. L. AUBERT, president, and J. L. BARNESON, vice president of Bankline Oil Co., were married at the Brentwood Heights home of MR. and MRS. PAUL M. PAINE, and are now residing in Glendale, Calif.



MARKET DEVELOPMENTS . . .

Mid-Continent

MORE drastic downward adjustment of refinery gasoline yields with an approximately corresponding increase in recovery of burning oils is in prospect for Mid-Continent refiners. Assurance that Defense Supplies Corp. is prepared to reimburse refiners for operating losses incurred in reducing the output of its most valuable product was given at a meeting of government and District 2 officials in Chicago last week.

Another development that will exert some influence on Mid-Continent refinery markets over the next several months is the insistence that maximum possibilities of product exchanges and customer service be explored in order to reduce the requirements for rail transportation facilities in the Middle West.

Meanwhile, markets for all products continued strong. Natural gasoline in Oklahoma (Group 3) territory was reported strong at 3.125 cents per gallon, up 0.125 cent on the previous week's high and 0.250 cent higher than the low. North Texas prices moved up by corresponding margins.

Refinery gasoline is scarce and steady at the fractionally higher prices so far as the tank-car market is concerned. A few spots of weakness in the tank-wagon market at scattered Middle West points is reported but they are of comparatively minor scope and severity. Several refiners are active buyers in the spot market. The range of prices continues at 5.75 to 6 cents per gallon, although the quantity of gasoline available at the low of the range is diminishing constantly.

Fuel oils are firm at ceiling prices and little material, from kerosene through residual, is available on the open market.

Gulf Coast

HOUSTON, Tex.—There is little activity in the Gulf Coast refinery market this week. The gasoline situation still is confused over the possibility that recent advances in prices in the East may be rescinded if increased transportation costs are absorbed by RFC as now proposed. There is a growing feeling, however, that any absorption by RFC of increased transportation costs, even if eastern price advances are rescinded, will be beneficial to Gulf Coast price structures. Movement during the past week was limited to several cargoes of lend-lease material.

In its inventories as of July 15, the Gulf Coast Refiners Association reported an improvement in stocks. Total gasoline stocks were 2,906,765 bbl. which is a decrease of 450,680 bbl. since July 1. Total stocks of all petroleum products decreased 604,869 bbl. to a total of 5,978,159 bbl. Crude runs for the 14 companies comprising the association group totaled 1,060,503 bbl. during the first half of July, or 70,700 bbl. daily, which is at the rate of 41.6 of total rated capacity of 170,000. This is a decrease of 10.9 per cent in operations since July 1.

SENTENCE SUMMARIES

MID-CONTINENT: Refinery gasolines scarce. Prices fractionally higher. Naturals gain strength. Fuels firm at ceiling levels.

GULF COAST: Lack of transportation continues to restrict refinery product sales. Kerosene, gas oils and fuels firm. Gasolines uncertain.

EAST COAST: Further reduction in gasoline allowances expected. Heating oil inventories increase but are below normal.

PENNSYLVANIA: Both gasoline and fuel oil active. Lubricating oils mixed.

PACIFIC COAST: Gasolines slow. Fuel oil strengthens. Gas oil steady. Naturals holding own.

East Coast

NEW YORK.—Elimination of all fuel-oil deliveries except for hot-water-heating purposes from August 3 to September 15 in the Atlantic seaboard area emphasizes the critical nature of the fuel-oil storage position in the East Coast rationing area. Additions are now being made to heating-oil inventories but they are reported to be substantially less than normal and insufficient to meet demands that normally develop in the fall.

The War Production Board's action in cutting deliveries to a minimum also made it appear more likely that the proposed reduction in the value of gasoline-ration coupons would be adopted. If the fuel-oil situation becomes extremely acute, it is possible that no gasoline will be permitted A-card customers. While such action would not be opposed by the oil industry it would place additional costs on it since it would replace the normally profitable gasoline market with a less profitable fuel-oil market.

First effects of gasoline rationing in the East Coast area are shown in the A.P.I. compilation of state gasoline sales compiled from tax receipts for the month of May. These show that taxable gasoline sales in New England, hardest hit area, dropped from 153,768,000 gal. in May 1941 to 110,565,000 gal. in May 1942, a decline of 28 per cent. Massachusetts, largest New England gasoline-consuming state, dropped 30 per cent.

Western Pennsylvania refiners continued to enjoy a good market for gasoline and fuel oil, but their vital lubricating-oil position was mixed with bright and cylinder stocks enjoying a strong demand but neutral oils continued to pile up.

A.P.I. REFINERY REPORT

Week Ended July 25, 1942

(Figures in thousands of barrels)

	Dly. crude runs to stills	Stocks Gasoline	Residual	Gas oil
Appalachian	156	2,741	580	565
Ind., Ill., Ky.	760	15,532	3,507	3,424
Okla., Kans., Mo.	354	7,305	1,478	1,499
Censored group*	1,670	39,082	17,424	17,432
Rockies	94	2,202	574	398
California	624	15,419	11,648	54,253
Total July 25, 1942	3,658	82,281	77,816	35,966
Total July 18, 1942	3,582	84,069	77,230	35,176
Total July 26, 1941	3,932	85,073	91,466	42,126

Note: Refinery runs and stocks for week ended August 1, 1942, appear on Trends page.

*Reports combined on East Coast, Gulf Coast, Louisiana-Arkansas and Inland Texas at request of OPC.

CRUDE-OIL STOCKS

(Bureau of Mines estimate)

Week ended:	Bbl. of crude*
July 25, 1942	249,262,000
July 18, 1942	250,505,000
July 26, 1941	252,728,000

*Excludes heavy, unrefinable stocks in California.

Pacific Coast

LOS ANGELES, Calif.—Very little gasoline is moving in the spot market, and sales generally are somewhat lower than a year ago. This is reflected in a report just compiled showing sales for the first 6 months of this year 5.06 per cent below those of the corresponding period of 1941.

Demand for fuel oil continues at a high rate, bringing further withdrawals from stocks. Gas-oil and diesel-oil prices are steady although little material is moving. Sellers are content to hold stocks in anticipation of more intensive demand later.

Natural gasolines are about holding their own. Production of naturals is being reduced to some extent by curtailment in production of light refining grades of crude oil. Several natural-gasoline plants recently have been shut down and wet gas diverted to other plants because of the drop in gas volume and pressure. Marketers no longer are insisting on low-pressure stabilized natural.

Lubricating oils continue disturbed but some improvement is expected as a result of recent litigation which has clarified to some extent the reclaimed oil situation. Reclaimed oil is now required to be so labeled and can no longer be marketed as "Pennsylvania oil" in competition with other lubes.

REFINERY AND TANK-WAGON PRICES

(Prices as of August 4)

Refinery Gasoline

Octane (A.S.T.M.):	†80	78	74-76	72-74	68-70	63-66	60 & lower
Mid-Continent*	.....	.....	.....	5.750-6.000	.....	5.375-5.625	5.000-5.125
Pennsylvania	.....	.....	6.750-7.000	.....	.....	.....	.....
Gulf Coast‡	6.00-6.50	.....	.....	§5.750-6.250	§5.750-6.250	§5.250-5.750	§5.000-5.500
Northeast Coast	12.200	.....	.....	11.700	11.700	.....	.....
Pacific Coast	.....	6.750-7.000	6.500-6.750	6.375-6.500	6.000-6.375	5.500-5.750	5.000-5.125

*Basis Group 3. †1939 C.F.R. (research method). ‡Integrated companies restricted to lowest prices. §Unleaded.

Quotations are f.o.b. plant in cars and in cents per gallon except where otherwise noted. They are exclusive of the federal excise taxes of 1.5 cents a gallon on gasoline and 4.5 cents a gallon on lubricating oils, and do not include marine lighterage charges.

Natural Gasoline

Grades:	26-70	18-55	75-85(350-375)
Oklahoma (Group 3)	3.125	3.750	.....
North Texas	2.750	3.390	.....
North Louisiana	2.875	3.450	.....
California	.....	.....	5.000-5.500

Kerosene and No. 1 Fuel Oil

Gravity:	46	45	42-44	41-43	38-40
Mid-Continent*	.....	.....	4.500-4.750	4.375-4.625	.....
North Louisiana	.....	.....	.....	4.500-4.750	.....
Pennsylvania	6.250	6.125-6.250	.....	.....	.....
California	.....	.....	.....	4.500-5.500	4.250
Northeast Coast	.....	.....	.....	7.700	.....
Gulf Coast	.....	.....	.....	3.875	.....

*Basis Oklahoma Group 3.

Tractor, Diesel, and Bunker Fuel Oil

Specifications:	46-48° G.	24 D.I.	48-52 D.I.	58 & above	Diesel bunkers	Bunker C
Mid-Continent*	4.125	.....	.....	.....	.....	.....
California	.....	2.750-4.000	.....	.....	‡$1.35-1.45	$0.85-0.90
Gulf Coast	.....	.....	4.000	4.125	1.45	0.85
Northeast Coast	.....	.....	.....	7.800	2.222	1.80
North Louisiana	.....	.....	.....	.....	.....	†0.80-0.85

*Basis Oklahoma Group 3. †10-14° gravity. ‡Pacific Specification 200.

Furnace Oil, Gas Oil, Fuel Oil

	No. 2	No. 3	No. 5	No. 6
Mid-Continent*	3.500-3.625	3.375-3.500	$0.85	$0.85
Pennsylvania (West)	5.625-5.875	5.375-5.875	†5.250-5.500	.....
Northeast Coast	7.8	7.8	1.85	1.80
Pacific Coast	5.5	5.5	‡0.80-95	$0.80
Gulf Coast	3.875-4.0	.....	1.65	0.85

*Basis Oklahoma Group 3. †36-40 gravity fuel oil. ‡Pacific Specification 300. §Pacific Specification 400.

Lubricating Oils

Bright and Steam Refined

OKLAHOMA (Group 3)—

200-210 D, 10-25	27.00
150-160 D, 0-10	23.00
120-125 D, 0-10	22.00
Steam refined:	
600 dark green (untreated)	9.00
600	9.50

PENNSYLVANIA—

Bright Stocks (Pennsylvania Grade No. 8 color, 140-150 at 210, 545-550 flash):	
10 pour point	30.50
15 pour point	29.50
25 pour point	25.00 28.00
Steam refined:	
600	15.00 16.00
650	15.50 16.50
600 flash	16.00 17.50
630 flash	17.00 17.50

Neutral Oil

(Vis. at 100° F. except Pennsylvania and color N.G.A.)

OKLAHOMA (Group 3)—

0-10 pour point:	
200-3	15.00
300-3	18.00
500-3	19.50
600-3	20.00

Note: Viscous neutrals, 10-25 pour, quoted 0.5 cent under 0-10 oils.

Neutral Oil

CALIFORNIA

Pale oils:		
200-2½-3	7.00	7.75
400-3-4	7.25	8.00
600-3-4	8.75	11.00
Red oils:		
200-4-5	7.00	7.75
400-5-6	9.00	11.00
500-900, 5-6½	9.25	11.25

GULF COAST—

Pale oils:		
200-3	8.50	8.75
300-3	9.00	9.25
500-3½	9.75	10.00
750-3½	10.00	10.25
2,000-4	10.50	10.75
3,000-4	12.25	12.50

PENNSYLVANIA—

150 vis. at 70° F., 3 color, 400-405 flash:	
Zero pour point	38.50
10 pour point	37.50
15 pour point	36.50
25 pour point	31.00
200 vis., at 70° F., 3 color:	
Zero pour point	40.50
10 pour point	39.50
15 pour point	38.50
25 pour point	33.00

Wax

(Cents per pound)

OKLAHOMA (Group 3)—	
124-126 (A.m.p.) w.c. scale	4.350-4.550
PENNSYLVANIA (inland refineries)—	
122-124 (A.m.p.) w.c. scale	4.250
124-126 (A.m.p.) w.c. scale	4.250

NEW YORK—

Wax in bags fully refined:

130-132 (A.m.p.) wax	6.250
133-135 (A.m.p.) wax	6.550
Crude scale:	
124-126 (A.m.p.) w.s.	4.350-4.455
124-126 (A.m.p.) y.s.	4.350-4.455

EXPORT PRICES

Gasoline—60-62° Gravity, Maximum 400 End Point

Octane:	72-74	68-70	65-66	60
Gulf Coast	6.500	6.250-6.500	5.875	5.625
Pacific Coast	.....	6.125-6.500	5.875-6.000	5.500-5.625

Distillate and Fuel Oil

	Kerosene	Diesel fuel				Bunker
	41-43	24 G.	48-52 D.I.	58 D.I.	Bunkers	C grade
Gulf Coast	4.000-4.250	.....	4.125-4.375	4.375	$1.65-80	$0.85-95
Pacific Coast	4.750-5.000	1.25-30	.....	.....	†1.35-45	*0.80-90

*Pacific Specification 400. †Pacific Specification 200.

Lubricating Oils

	Neutral oils		Bright and cylinder stocks		
	200-3	150-3	200-3	150-3	600&630 S.R.
Mid-Continent	16.8	.....	28.8	24.8	.....
Pennsylvania	43-50	41-46	36-37	36-37	26.5-27

GASOLINE AND KEROSENE TANK-WAGON PRICES IN 50 CITIES

(Gasoline prices based on regular grades, tax included, undivided dealer)

ATLANTIC AND NEW ENGLAND

(Socony-Vacuum Oil Co., Inc., and Atlantic Refining Co.)

	Dealer tank wagon	Combined tax	Kero. tank wag.
Baltimore, Md.	17.55	5.50	11.10
Boston, Mass.	17.00	4.50	10.40
Burlington, Vt.	19.00	5.50	.....
Buffalo, N. Y.	18.30	5.50	11.20
Dover, Del.	18.80	5.50	12.80
Hartford Conn.	17.70	4.50	.....
Manchester, N. H.	19.40	5.50	11.40
Newark, N. J.	16.80	4.50	10.30
New York, N. Y.	18.20	5.50	10.40
Philadelphia, Pa.	18.30	5.50	12.55
Pittsburgh, Pa.	18.80	5.50	12.90
Portland, Me.	18.40	5.50	10.50
Providence, R. I.	17.10	4.50	10.20
Washington, D. C.	16.80	3.50	11.60
Average 14 cities	18.01	5.07	11.28

(All prices undivided dealer basis.)

CENTRAL

(Standard Oil Co. of Indiana, Standard Oil Co. of Ohio, Continental Oil Co. and Texas Co.)

	Dealer tank wagon	Combined tax	Kero tank wag
Chicago, Ill.	13.40	4.50	10.30
Cleveland, Ohio	15.00	5.50	*9.00
Dallas, Tex.	13.00	5.50	7.00
Des Moines, Iowa	14.40	4.50	9.80
Detroit, Mich.	14.40	4.50	9.60
Fargo, N. D.	16.90	5.50	11.30
Huron, S. D.	16.30	5.50	10.70
Indianapolis, Ind.	15.20	5.50	9.80
Little Rock, Ark.	17.50	8.00	10.00
Milwaukee, Wis.	16.10	5.50	10.50
Minneapolis, Minn.	15.40	5.50	10.30
Omaha, Neb.	15.40	6.50	9.80
Tulsa, Okla.	16.50	7.00	8.50
Wichita, Kans.	12.70	4.50	8.00
Average 14 cities	15.15	5.57	9.61

*Includes 1-cent state tax.

SOUTHEASTERN

(Standard Oil Companies of New Jersey, Kentucky, and Louisiana)

	Dealer tank wagon	Combined tax	Kero tank wag.
Atlanta, Ga.	21.50	7.50	11.40
Birmingham, Ala.	23.10	8.50	11.00
Charleston, S. C.	21.05	7.50	.....
Charleston, W. Va.	21.35	6.50	11.90
Charlotte, N. C.	22.20	7.50	11.90
Jacksonville, Fla.	21.50	8.50	10.40
Jackson, Miss.	18.00	7.50	8.50
Louisville, Ky.	17.00	6.50	8.50
Memphis, Tenn.	17.75	8.50	10.50
New Orleans, La.	17.25	8.50	*10.00
Norfolk, Va.	19.45	6.50	12.60
Average 11 cities	19.92	7.59	10.67

*Includes 1-cent state tax.

MIDWESTERN

(Continental Oil Co.)

	Dealer tank wagon	Combined tax	Kero tank wag
Albuquerque, N. M.	17.50	7.50	10.00
Boise, Idaho	20.10	6.50	16.50
Casper, Wyo.	17.90	5.50	12.00
Denver, Colo.	14.50	5.50	11.00
Helena, Mont.	17.00	6.50	13.00
Phoenix, Ariz.	18.50	6.50	12.50
Reno, Nev.	17.50	5.50	13.50
Salt Lake, Utah	18.50	6.50	14.50
Average 8 cities	17.58	6.25	12.88

PACIFIC COAST

(Standard Oil Co. of California)

	Dealer tank wagon	Combined tax	Kero tank wag.
Portland, Ore.	17.00	6.50	13.50
San Francisco, Calif.	14.50	4.50	11.50
Seattle, Wash.	17.00	6.50	13.50
Average 3 cities	16.17	5.83	12.83
Average 50 cities	17.47	5.96	11.02
Average last week	17.47	5.96	11.02

Appalachian Fields

(Continued from Page 75)

cu. ft. gas, Injun 1,994 ft., gas 2,283-90 ft., T.D. 2,336 ft.

Lincoln County, Jefferson district: United Fuel 5102 Elliot Lovejoy, 288,000 cu. ft. gas, lime 1,734-1,929 ft., Berea 2,432-56 ft., brown shale 3,150-90 ft. and 3,525-3,842 ft., shot 3,528-3,851 ft.; R.P., Big lime, 90 lb., Berea and brown shale 345 lb.; T.D. 3,853 ft.

Turtle Lick Gas Co. 1 George Thompson, drilled deeper, 381,000 cu. ft. gas, started deepening 2,465 ft., brown shale 3,270-3,525 ft., T.D. 3,721 ft.

Washington district: United Fuel 5079 D. N. Mohler, 1,784,000 cu. ft. gas, Big lime 1,624 ft., T.D. 1,759 ft., no shot.

Mingo County, Warfield district: Burning Creek Marrowbone Land Co. 1 fee, drilled deeper, 73,000 cu. ft. gas, started deepening 2,840 ft., brown shale 2,840-2,993 ft., shot 2,516-3,003 ft., T.D. 3,003 ft.

Tyler County, McElroy district: South Penn 6 Joseph McCormick, 5 bbl. Injun sand, T.D. 2,215 ft.

Upshur County: Meade district: Standard Gas Co. 1 W. A. Smallridge, 800,000 cu. ft. gas, Gordon sand 1,962-95 ft., gas 1,967-79 ft., Fifth sand 2,083-93 ft., gas 2,083-92 ft., T.D. 2,138 ft.

Wetzel County, Grant district: Carnegie 5 Wilson Ney heirs, 239,000 cu. ft. gas, Big Injun 2,005 ft., gas 2,014-20 ft., T.D. 2,064 ft.

Pittsburgh & West Virginia Gas Co. 1 Roland Barr, 221,000 cu. ft. gas; Big Injun 2,070 ft., gas 2,179-80 ft., R.P. 226 lb. 24 hr.; T.D. 2,191 ft.

ORISKANY GAS FIELDS

Jackson County, Ripley district: Mullins Gas Co. 1 George T. Parsons, 10,560,000 cu. ft. gas, Oriskany 5,060 ft., T.D. 5,087 ft.

Columbian Carbon Co. 2 W. A. Carney, 6,053,000 cu. ft. gas, not shot; Oriskany 5,265-5,323 ft., R.P. 1,600 lb. 24 hrs., T.D. 5,350 ft.

Washington district: United 5100 C. W. and S. G. Starcher, 16,230,000 cu. ft. gas, not shot; Oriskany 5,187 ft., R.P. 1,575 lb. 72 hr.; T.D. 5,200 ft.

United Fuel 5090 J. F. Staats, 12,327,000 cu. ft. gas, not shot; Oriskany 5,033 ft., T.D. 5,050 ft.

Crude-Oil Prices

Representative selected crude prices from all sections of the country appear below:

East Texas	$1.25
Conroe	1.43
Tepetate, Louisiana	1.18
Smackover, Arkansas, heavy	.83
Illinois basin	1.37
Pecos County, Texas	.95
Lance Creek, Wyoming	1.12
Bradford, Pennsylvania	3.00

Gravity Schedules

Top prices include all gravities above grades designated, and low prices include all gravities below grades designated:

Gravity	Signal Hill, Calif.	Oklahoma, Kansas	Gulf Coast, Texas	West Texas*
18-18.9	$0.80	.....	.....	.....
19-19.9	.84	.....	$1.06	$0.70
20-20.9	.88	$0.85	1.08	.72
21-21.9	.92	.87	1.10	.74
22-22.9	.96	.89	1.12	.76
23-23.9	1.00	.91	1.14	.78
24-24.9	1.03	.93	1.16	.80
25-25.9	1.07	.95	1.18	.82
26-26.9	1.11	.97	1.20	.84
27-27.9	1.15	.99	1.22	.86
28-28.9	1.18	1.01	1.24	.88
29-29.9	1.20	1.03	1.26	.90
30-30.9	1.23	1.05	1.28	.92
31-31.9	.....	1.07	1.30	.94
32-32.9	.....	1.09	1.32	.96
33-33.9	.....	1.11	1.34	.98
34-34.9	.....	1.13	1.36	1.00
35-35.9	.....	1.15	1.38	1.02
36-36.9	.....	1.17	1.40	1.04
37-37.9	.....	1.19	1.42	1.06
38-38.9	.....	1.21	1.44	1.08
39-39.9	.....	1.23	1.46	1.10
40 and above	.....	1.25	1.48	1.12

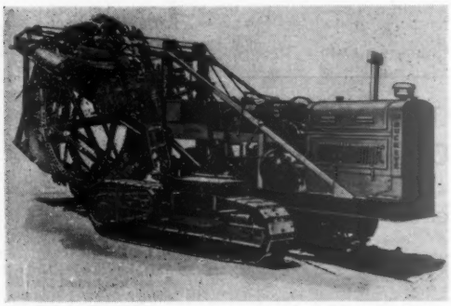
*Includes Lea County, New Mexico.

EQUIPMENT PROGRESS...

New Bulletin on Model 12 Trencher Is Announced

With trenching machinery very much in demand nowadays for new pipe lines, drainage projects, army camps, municipal work, and other ditching jobs, the Buckeye Traction Ditcher Co., Findlay, Ohio, is particularly timely with its Model 12 Trencher Bulletin.

The Model 12 Buckeye wheel-type trencher is fast, rugged, and economical; and its efficiency is vouched for by pipe-line, sewer, and water-pipe contractors and



municipalities. It digs a straight-sided round bottom trench up to 24 in. wide and 5 ft. 6 in. deep. It is compact and has remarkable maneuverability.

The Model 12 has a number of special features which are fully described in the new two-color bulletin which is sized for convenience in filing and for ready reference. It is profusely illustrated.

TRADE LITERATURE

EASTMAN OIL WELL SURVEYS, Dallas, Tex., and Long Beach, Calif.—Catalog 41, presenting important information concerning applications of controlled directional drilling and oil-well surveys, including deflecting tools, orienting services, survey instruments, multiple shot survey service, bits, reamers, milling tools, and casing roller service. It covers instructions for operation of instruments and tools, together with detailed specifications.

WORTHINGTON PUMP & MACHINERY CORP., Harrison, N. J.—Bulletin on horizontal duplex plunger power pumps, type KUF, for general high-pressure hydraulic service, water flooding in oil fields, and for pipe lines and oil refineries. The bulletin is generously illustrated, both with photographs and drawings. The bulletin is No. W-412-B10.

NORTON CO., Worcester, Mass.—"Grits and Grinds," Vol. 33, No. 7.—This issue contains an article on gear-tooth grinding, a short discussion of mushroom pads, several helps for new grinder men, and a description of a small end mill grinding attachment.

E. D. BULLARD CO., 275 Eighth Street, San Francisco., Calif.—A vest-pocket size, thumb-indexed civilian defense index, complete with blackout instructions, precautions to take against gas attacks, and complete first-aid instructions. Included in the guide is a two-color pressure-point chart with directions on how to stop bleeding, in addition to many other approved practices to be followed during wartime emergencies. Much of the information may be applied to every-day industrial accident problems. The booklet is free on request.

AIR REDUCTION SALES CO., 60 East Forty-second Street, New York.—A 14-page "fight-waste" bulletin, which consists of a series of shop posters, designed to help arc-welding operators do more useful work with every electrode. Each of the six posters illustrates a common wasteful practice, and adjacent, the corresponding good practice. The posters are securely bound but are perforated for ease in detaching.

On July 25, Abbott and Costello, famous radio comedians team, gave a 30-minute program at the plant of Cardwell Manufacturing Co., Wichita, Kans., including a pep talk on war bonds, and a skit. Shown in the picture are H. W. Cardwell (third from left), Bob Smith, Cardwell sales manager (extreme right), with Bud Abbott and Lou Costello

Tool Holder Speeds Lathe Work And Tool-Changing Time

A simple and rugged engine-lathe tool holder that cuts tool-changing time to approximately 5 seconds and

greatly reduces operating time has been developed by Lane-Wells Co., engineer and manufacturer, Los Angeles, Calif.

Known as the Lane-Wells Universal Tool Holder, the device consists of a tool post which can be fitted on to any engine lathe carriage compound rest. Into a cylindrical member, clamped into the tool post, fit the detachable heads. Standard high-speed tool bits used for boring, turning, threading, facing, or forming are fastened into the heads and each bit remains in place in the head. Drills and reamers can also be used.

In practice the lathe operator has several heads each carrying a tool to perform a certain operation on the stock. The first head is placed in the tool holder and locked in place by a quarter turn of the control handle. As soon as the operation on the stock is performed by the first tool, the operator releases the head, replaces it with the second head, locks it in place and is ready for the next operation. The change requires approximately 5 seconds. After the sizes are once established all readings can be taken from the cross-feed dials.

If a particular tool must be removed and then reinserted in the tool holder, as for example when a particular working operation is interrupted by other work to be done, the Universal Tool Holder permits the original tool to be reinserted in the tool holder in exactly the same position it originally occupied. Work can then be resumed without the necessity of resetting the position of the tool holder relative to the work. The ordinary engine lathe, equipped with the Universal Tool Holder and a supply of detachable heads, makes possible any number of operations. The one tool holder will perform either outside turning or boring operations.

In actual practice during the past year in the Lane-Wells plant, in the manufacture of oil-well supply parts, the Universal Tool Holder made possible a reduction of 35 per cent in machining time on many operations. Four sizes of the device fit all standard makes of engine lathes from 10-in. to 24-in.

Nicklin, Oil Well Supply Co., To Have Office in New York

Effective August 1, 1942, M. E. Nicklin, manager of the export division, Oil Well Supply Co., 30 Rockefeller Plaza, New York City, will have his office at the manufacturing headquarters of the company at Oil City, Pa.

Mr. Nicklin will continue as manager of the export division, dividing his time between New York and Oil City offices, thus bringing about a closer liaison between production and the export trade.

R. H. McPeake, sales manager of Oil Well Supply Co., export division, will continue his headquarters in New York City and will be in charge of the New York office when Mr. Nicklin is out of the city.

AMONG EQUIPMENT MEN...

Los Angeles Nomads Party Attracts 200 Members, Guests

Nearly 200 Nomads and their guests enjoyed the annual Wing-Ding of the Los Angeles chapter of Nomads held at the Cheviot Hills Country Club, Los Angeles, Calif., during the entire day and evening of July 24. Starting off with a golf tournament in the morning and afternoon, games of skill were then played until dinner was served. After the dinner, golf, gaming and door prizes were awarded. The tables were then removed and chairs arranged around the hall to supply good seats for everyone to see the girl show which climaxed the entertainment.

A silver cup was awarded for the low gross golf score and was captured by A. K. Smith, of Western Gulf Oil Co. Six blind-bogey prizes were to be given but two will have to be awarded later because of a tie. Those receiving their prizes were Fred Currie, Timken Steel & Tube Division; Jim Creed, Halliburton Oil Well Cementing Co.; Ralph Porter, Standard Oil Co. of California, and F. A. Driskill, Iraq Petroleum Co. Herb White, Republic Supply Co.; Paul Huggins, Western Gulf Oil Co., and George Trembley, Howard Supply Co., will play off the tie for the two other prizes.

All prizes except those for golf were war bonds and stamps. Those winning bonds for their skill in the games played before dinner were Paul Cavins, a $50 bond; Jud Saatjian, Texas Co., a $25 bond; and Bob Elche, a $25 bond. The first door prize of a $25 bond went to Bill McGuirk, Eason-Theroif Tool Co. Ted Sutter, Baker Oil Tools, Inc., won $10 in stamps as did Ray Love, Tide Water Associated Oil Co.

Pittsburgh Steel Co. Makes Several Personnel Changes

J. K. Beeson, sales vice president of Pittsburgh Steel Co., Pittsburgh, Pa., recently relinquished his civil duties to join the Army Air Corps with the commission of captain. Mr. Beeson has been associated with the company for the past 12 years in both operating and sales capacities.

Joseph A. Voelker, formerly district sales manager at New York, N. Y., has been appointed general manager of sales and is stationed at Pittsburgh. W. F. Boore, who has been connected with the company's New York office for several years, has been made acting district sales manager for that office.

L. A. Ver Bryck, who has been district sales manager at Pittsburgh, Pa., has been made Washington, D. C., sales representative. Joseph G. Smith has been made acting sales manager of the company's Pittsburgh district office and also continues his duties as compliance coordinator for the purchasing department.

A. S. Vandervoort, Jr., for many years district sales manager at Houston, Tex., is now commissioned as a captain in the Army Air Corps. Paul R. King, who has been connected with the company's Houston office for several years, has been made acting district sales manager for that office.

Boylan Joins Buda as Field Representative

Frank M. Boylan has just joined the Buda Co., Harvey, Ill., manufacturer of diesel and gasoline engines, railway equipment, and lifting jacks, as a field representative in the industrial division handling railroad products and lifting jacks. Mr. Boylan before joining the Buda company was on the sales force for 10 years of the Nester-Johnson Manufacturing Co. of Chicago; 2 years with Firestone Rubber Co., West Virginia; and 8 years with Ingersoll Watch Co. He attended the University of Rochester, Rochester, N. Y., and served 18 months in France during the last war.

Carter Heads Export Division of W. C. Norris, Manufacturer, Inc.

Edward L. Carter has been appointed manager of the export division of W. C. Norris, Manufacturer, Inc., Tulsa, and will maintain offices at Room 1809, R.C.A. Building, New York. The appointment became effective August 1.

Mr. Carter is a graduate petroleum engineer and has had 17 years of both domestic and foreign experience in engineering and operating phases of the industry.

Free Buttons for Drivers Who Sign Conservation Pledge

To further aid the national program of truck conservation being sponsored by the Office of Defense Transportation, Mack Trucks, Inc., is offering free buttons to drivers and mechanics who sign the U. S. Truck Conservation Corps pledge.

In these pledges now being issued by ODT, drivers and mechanics declare their intention to prolong the life of trucks entrusted to their care by seeing that all minor adjustments and repairs are promptly taken care of, and by cooperating in the national preventive maintenance program now under way.

Copies of the pledge can be secured personally or by mail from any Mack branch and once it is signed the Mack company will furnish free to the driver or mechanic a button identifying him as a member of the U. S. Tank Conservation Corps.

The button is 1¼ in. in diameter and is attractively designed in red, white, and blue. It bears the lettering, "U. S. Truck Conservation Corps. I Am Pledged to Keep 'Em Rolling."

Clark Drafted by Navy And Given Commission

H. K. Clark, vice president and general manager of Norton Co., who recently returned to Worcester after 9 months' service as a dollar-a-year man in the OPM and WPB, lastly as assistant deputy director of the Division of Industry Operations, is back in the capitol. This time he has been "drafted" by the Navy and with the rank of lieutenant commander is a member of the Army and Navy Munitions Board.

Kunkel Heads I.A.A. Chapter

At the annual business meeting of the members of Industrial Advertising Association of Southern California, a chapter of National Industrial Advertisers Association, John H. Kunkel, director of public relations and advertising for Fluor Corp., Ltd., was elected and installed as president of that association for the 1942-43 term.

Horton, Chicago Bridge Treasurer, Awarded Honorary Degree

Horace B. Horton, treasurer, Chicago Bridge & Iron Co., Chicago, was the recipient of the honorary degree of Doctor of Business Administration, from Thiel College, Greenville, Pa., at its commencement exercises June 1. Mr. Horton at present is serving on the War Labor Board and spends a great deal of his time in Washington.

Roberts Assistant General Manager Of Sperry-Sun Well Surveying Co.

Dwight C. Roberts, of the Houston, Tex., office of Sperry-Sun Well Surveying Co., now regional manager, has been promoted to assistant general manager. Mr. Roberts, who assumed his new duties August 1, will remain in the Houston office.

Herrington Elected Director of Military Engineering Society

A. W. Herrington, president of the Society of Automotive Engineers, technical advisor to Col. Louis A. Johnson on the recent American Economic Mission to India, and president of Marmon-Herrington Co., of Indianapolis, Ind., has been elected to serve for 3 years as a director of the American Society of Military Engineers.

Lindus Returns to Sales Department of Timken

F. H. Lindus, who has been handling various advertising assignments for Timken Roller Bearing Co., in Canton, Ohio, for the past year, has been returned to the sales department of the company's service division and is now located in the San Francisco, Calif., branch.

BOOKS

HANDBOOK OF CHEMISTRY AND PHYSICS. 25th Edition. Published by Chemical Rubber Publishing Co. 2,531 pages. $3.50.

This year the revisions to this useful handbook are unusually high in number and clearly reflect the rapid pace which has been set by industrial changes. Starting with the 1939 edition and including the current issue, considerably more than half the pages in the book have been added or completely revised and reset. These changes include such data as physical constants of inorganic, organic and industrial organic compounds, melting and boiling points of organic compounds, description of the elements, properties of commercial plastics, X-ray crystallographic data, gravimetric factors and their logarithms, definition of chemical terms, composition and value of foods, and many other important tables. The collection of abbreviations and symbols formerly contained in the handbook has been completely revised. The list of proposed letter symbols and abbreviations published by the committee of the American Association of Physics Teachers has been used as a basis.

Handbook of Chemistry and Physics may be purchased through the Book Department of The Oil and Gas Journal at the established retail price of $3.50, postage prepaid (extra outside the United States), and a copy will be forwarded promptly upon receipt of check or money order for that sum. Where payment is not provided, the book will be sent c.o.d. to avoid delay.

CLASSIFIED ADVERTISING

Patent Attorneys

PATENTS — TRADE MARKS

All cases submitted given personal attention.

Form "Evidence of Conception" with instructions for use and "Schedule of Government and Attorney's Fees—FREE.

LANCASTER, ALLWINE & ROMMEL
Patent Law Offices
418 Bowen Bldg., Washington, D. C.

Leases and Drilling Blocks

LEASES—East Texas, La., South Ark. 20 acres up, dollar acre up.—Owners—Address Attorney, Box 1122, Little Rock, Ark.

LEASES ROYALTIES

PRODUCING OR NONPRODUCING
Texas, New Mexico, Oklahoma, Louisiana and Illinois
20 Years' Experience
Inquiries Invited

B. D. BUCKLEY
Paul Brown Bldg., St. Louis, Mo.

U. S. OIL rights can be filed for lease developing area. Want several join filing block. Small expense. Box B-187, The Oil and Gas Journal, Tulsa, Okla.

FOR SALE: Oil and Gas leases on proven structures, drilling propositions, small production and fluorspar deposits. Reports furnished. W. P. Harley, Bowling Green, Ky.

OIL LEASES for sale in Dakota pool. Major companies now drilling. Prices and information. Write J. A. Charles, 232 E. 14th, Tulsa, Okla.

I OWN 17,240 acres of land at Guin, Ala. I would like to give an oil, gas and mineral lease to some one financially able to pay the rental on same. If I could get a good oil lease I would hold the land for the purpose of growing timber. H. H. Maschmeyer, 74 St. Francis St., Mobile, Ala.

PARTNER Wanted in 52190 acre solid block wildcat lease for development. Box B-182, The Oil and Gas Journal, Tulsa, Okla.

CHEAP CRANE COUNTY Sec. 18, B28, under Magnolia-Stanolind leases. Jefferson G. Smith, 215 Littlefield Bldg., Austin, Tex.

FOR SALE: Gas properties, average annual gross revenue, past three years, approximately $10.-000.00. For particulars address P. O. Box 388, Mannington, W. Va.

OPERATORS: 2800 acres Geologized, want drilled, will checker board or farm. bottom hole money. Box 232, Smith Center, Kans.

FOR SALE — FIVE YEAR OIL AND GAS LEASE (OKLAHOMA). GOOD DEAL. WRITE BOX 424, STILLWATER, OKLA.

Ranches and Farm Lands

A GILT-EDGE VALUE in ranch, 2160 acres priced, $22.50 per acre, well improved, will carry 800 head of cattle and supply all necessary feed; ideal for hog raising; 1100 acres of blue stem, Lespedeza and Bermuda pasture second bottom; 400 acres first bottom in cultivation, part in alfalfa and corn; 700 acres in timber pasture; 30 acres of grafted paper shell pecan grove; 2 modern residences, barns, stock and tool shed; fenced and cross fenced; abundance of water; one hour's drive from Tulsa; may also be purchased with stock and equipment. Blair Realty Co., Tulsa, Okla.

8,562 ACRE Archer County, Texas ranch for sale. Well improved, 200 acres cultivation, eight pastures, abundant water, fine grass, 60% tillable, no waste land, four oil pools, 35 oil wells, only about 2,000 acres under oil lease. Price $31.50 per acre, one-half cash — reserve one-fourth of mineral. More development. R. E. Lynch, 839 N. Beckley, Dallas, Tex.

Royalties

ANDREW J. BARRETT
The Philtower
Tulsa, Oklahoma.

WE BUY & SELL all types of Oil and Gas Royalties. Sales restricted to registered dealers only. Grimes Royalty Co., National Mutual Bldg., Tulsa, Okla.

FOR SALE—Landowner's Royalty under 160 acres leased to Humble Oil & Ref. Co. in Lea County, N. M., 27 pools in the county. Will sell in small interests. HARRY S. WRIGHT, FARMINGTON, NEW MEXICO.

WE MAINTAIN A MARKET FOR REGISTERED DEALERS IN ALL TYPES OF OIL ROYALTIES.

FIRST DEPENDABLE OIL CORP.
522 Fifth Ave., New York, N. Y.

FOR SALE: 25 acres good Oklahoma Royalty, excellent possibilities, leased to major company. Box 618, Great Bend, Kansas.

Incorporation

DELAWARE CHARTERS: Complete service $35. Submitted forms. Chas. G. Guyer, Inc., Wilmington, Delaware.

Situations Wanted

POSITION WANTED: Man with years of training in both accounting and production open for position to supervise both of these departments. Excellent references. Box B-190, The Oil and Gas Journal, Tulsa, Okla.

WANTED—Position with permanent location, as Geologist—Seismologist. B. S. and grad. work in geology, 8 years' exp. in geology and seismology. Age 33, Class 3-A, now employed. Will furnish detail information upon request. Inquire Box B-194, The Oil and Gas Journal, Tulsa, Okla.

WANTED: Affiliation with company interested in present or postwar foreign operations. 15 years' experience all phases European marketing, transportation, etc. Perfect knowledge French, German, some Spanish, Italian. Box B-184, The Oil and Gas Journal, Tulsa, Okla.

SQUAD of Engineers Capable of handling Design and Drafting on Power Plants, Chemical or Refiners. Wish employment as a group. Box B-193, The Oil and Gas Journal, Tulsa, Okla.

OIL ACCOUNTANT, 20 years field and office, know material, production, joint account auditing, major company procedure. The Oil and Gas Journal, Box B-215, Tulsa, Okla.

Help Wanted

NOTICE TO ADVERTISERS

Advertisers offering positions to workers skilled in critical war industries are requested by the War Manpower Commission to include the following sentence in their advertisement:

"Applications from those now employed in war industries will not be considered."

Help Wanted

MECHANICAL ENGINEER

Established midwestern pump manufacturer, doing high priority work, desires pump designer, experienced in centrifugal and reciprocating equipment for refinery service. Those who have had marine experience in addition preferred. This position will be permanent and will lead to position of chief engineer. Please reply giving all personal details as well as professional qualifications. All replies confidential. Box B-200, The Oil and Gas Journal, Tulsa, Okla.

WANTED

SUPERINTENDENT OF SERVICE by Chemical Company employing about 600 men. Location Gulf Coast. Must have knowledge and preferably experience in SAFETY ENGINEERING AND FIRE PREVENTION as applied to chemical plant and PERSONNEL AND EMPLOYMENT. Reply giving education, experience, references and salary expected in first letter. Box B-201, The Oil and Gas Journal, Tulsa, Okla.

ENGINEERS WANTED

Petroleum or Chemical Engineers for refinery process control; Midwestern Refinery; University Engineering School graduate with basic knowledge of fluid flow and heat transfer; advancement opportunity; in reply state present employment, past experience, education, marital status, minimum salary expected, and recent photograph. Box B-204, The Oil and Gas Journal, Tulsa, Okla.

MECHANICAL construction superintendent defense project prominent engineering firm has opening in Middle West for mechanical engineer who has had broad field experience in intricate refinery piping. Give full details regarding experience, salary, technical training, etc. in first letter. Applicants must be United States citizens. Box B-213, The Oil and Gas Journal, Tulsa, Okla.

POSITION OPEN—Chemical Engineer; Middle Western Oil Company. Must be experienced in general refinery operations, processing and development work; preferably lubricating oil manufacture, solvent refining etc. State education, experience, expected starting salary and draft status. The Oil and Gas Journal, Box B-212, Tulsa, Okla.

DRAFTSMEN

Midwestern Oil Refinery; 2 years or more experience on process piping, structural or electrical drafting. state age, marital status, education, past experience and minimum salary expected. The Oil and Gas Journal, Box B-211, Tulsa, Okla.

DESIGNING ENGINEER

Mechanical or Chemical Engineering education with five or more years experience in refinery process and equipment designing. In reply state present employment, past experience, education, marital status, and minimum salary expected. The Oil and Gas Journal, Box B-214, Tulsa, Okla.

POWER PLANT ENGINEER

Mid-West Industrial Plant; experienced in operation and maintenance of high pressure boiler plant. State present employment, past experience, education, marital status, and minimum salary expected. The Oil and Gas Journal, Box B-210, Tulsa, Okla.

Oil Industry Printing

OIL FIELD LEGAL BLANKS

Leases, assignments, releases, township plat books, well records, etc. Request on your letterhead gets free catalog. Olds Press, 215 East Third St., Tulsa, Okla.

Financing

CAPITAL SEEKERS — Interested in raising $25,000 or more for a legitimate project should communicate with AMSTER LEONARD, Fox Theater Bldg., Detroit, Mich.

OUT OF 5000 American financial houses only 223 bought small issues last few years. The 223 names $4.00. JOHN F. MORRIS, Box 5411, Philadelphia.

Legal Blanks

BURKHART'S legal blanks and general forms serving Mid-Cont. oil field since 1908—Okla. Kans. N. Mex. Tex. Ala. Ark. Fla. Ga. Ill. Ind. Ky. La. Mich. Miss. Mo. Neb. N. Dak. Tenn. Wyo. Free catalog samples on request. Burkhart Ptg. & Sta. Co., 115 S. Cinn., Tulsa, Oklahoma.

Equipment Wanted

WANTED
Large Steel Storage Tanks and Structural Steel Buildings.
GREENSPON'S
National Stock Yards
(St. Clair County), Ill.

OPERATOR wishes to purchase for cash 3 or 4 used Cummins Diesel L1-600 Drilling Engines with chain transmission, slush pump and hoisting equipment of size of Wilson Giant or Titan drawworks. Please communicate all particular including prices to P.O. Box 5051, Metropolitan Station, Los Angeles, Calif.

WANTED
2—35,000-55,000 bbl. storage tanks.
2—1300' air compressors.
20—25 ton locomotive cranes.
R. C. STANHOPE, INC.
60 E. 42nd St., New York, N. Y.

WILL PAY CASH

Storage tanks, abandoned pipe lines or wells, gasoline plants, refineries or any material accumulating from the oil fields regardless of location, WILL HANDLE UNLIMITED DEALS.

PLANT and EQUIPMENT PURCHASING CORP.
606 Fountain Sq. Bldg., Cincinnati, Ohio

WANTED—BULK PETROLEUM STORAGE, 10,000 BBLS. TANKS OR LARGER. Box B-120, The Oil and Gas Journal, Tulsa, Oklahoma.

For Sale—Equipment

FOR SALE at Wewoka: 1-10 ton Athey Trusswheel wagon, Model 843, Serial J616. $150. Patridge, Cities Service Oil Co., Bartlesville, Okla.

FOR SALE—One 96 foot rotary drilling derrick now standing near Seminole, Oklahoma. Good condition. price $600.00. Inquire Eason Oil Co., Enid, Okla.

FOR SALE
35 H.P. Superior Gas Engine and 16 foot Band Wheel Power. Condition A-1. The Geo. McGinley Supply Co., Bowling Green, Kentucky.

FOR SALE: Star Mfg. Company, portable cooling tower, telescoping type, 7' wide, 13' long, 8' high. All steel. Melton Machinery & Supply Co., Seminole, Okla.

FOR SALE
REFINERY EQUIPMENT

One—40' x 40' long 4" thick, A. O. Smith Corporation Reaction chamber, hammer forged, excellent condition.

Two—6'-6" diameter x 37'-6" long x ¾" shell thickness x ⅞" head fractionating columns, complete with nine cast iron bubble decks each. Can furnish detailed drawings for refabrication of these two fractionating columns into one column size 6'-6" x 65', comprising 18 bubble decks and 8 side-to-side trays.

One—2,300 gallon per minute Braun Redwood cooling tower.

One—5' diameter x ⅜" shell thickness x 74' long crude fractionator complete with 18 bubble decks.

ARROW PETROLEUM CO.
7419 Franklin St., Forest Park, Ill.

FOR SALE: 2—100 ton Stillman Watson Hydraulic Jacks. 1—12" lift—540 lbs. weight; 1—18" lift 575 lbs. weight. Price $300 cash, in good condition. W. E. Hamman, Box 97, Wirt, Okla.

FOR SALE: Four 125-HP, 250# working pressure boilers, Oilfield type; also one 7" R. B. Union Tool unitized draw works. good condition, almost same as new. Inquire. T. T. Eason & Company, Enid, Okla.

CLASSIFIED ADVERTISING RATES

Classified advertising rates: First insertion, 35 cents a line; each additional insertion, 25 cents a line, PAYABLE IN ADVANCE. Six words usually make a line. Count as a word each one-letter word and each group of figures. White-space computed at regular line rate. Allow two extra lines for blind ads. Ads of less than three lines not accepted. No formal acknowledgment is made, and proofs cannot be shown in advance of publication.

	1 time	2 times	3 times	4 times
3 Lines	$1.05	$1.80	$2.55	$3.30
4 Lines	1.40	2.40	3.40	4.40
5 Lines	1.75	3.00	4.25	5.50
6 Lines	2.10	3.60	5.10	6.60
7 Lines	$2.45	$4.20	$5.95	$7.70
8 Lines	2.80	4.80	6.80	8.80
9 Lines	3.15	5.40	7.65	9.90
10 Lines	3.50	6.00	8.50	11.00

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Classified Display is set with a border and may be used in one or two column sizes.

1 Inch	1 time	$5.00
1 Inch	13 times	4.50 per inch
1 Inch	26 times	4.00 per inch
1 Inch	52 times	3.50 per inch

This space may be contracted for over a period of one year from the date of the first insertion and is PAYABLE IN ADVANCE, MONTHLY.

Announcing

EXPANDED SHOPS & WAREHOUSE FACILITIES

To Improve Our Service

We have just moved into our new and enlarged home, Union Avenue at Twenty First St. in Tulsa, where we are now better able to serve you. You are invited to visit our new offices and shops and inspect our stocks.

Fully reconditioned refinery equipment of all kinds—pressure vessels, pumps, bubble towers, tanks, valves and fittings, heat exchangers, compressors. No priorities required. Send us your inquiries.

SONKEN-GALAMBA SUPPLY COMPANY

BRANCH OFFICE
W. C. Berry or H. J. Galamba
Riverside at Second, Kansas City, Kansas

MAIN OFFICE
Robert W. Duden
Twenty-First at Union, Tulsa, Oklahoma

ALL OR ANY PART—COMPLETE 2000 BARREL REFINERY

2000 bbl. Pipe Still, 2½" ID x 2 15/16" OD x 20' Tubes Alloy Headers — 8 Heat Exchangers, 255 sq. ft. ea. All New Tubes — Complete Copper Sweetening Unit — New Carload Ethyl Plant — 47 Storage Tanks from 500 to 15000 bbl. cap. — 30 Pumps All Types — Valves — Fittings — Pipe

THE PLAINS OIL & REFINING CORPORATION
GREAT BEND, KANSAS

FOR SALE: Oil Hill, Kansas 3 Sullivan Improved N Hydraulics only $100.00 ea. 6—3" x 4" GD chain driven power pumps. $50.00 ea. 4—2" Viking Pumps $10.00 ea. 1—CN Sullivan Drill, $250.00. 1—Sullivan 20 drill only $250.00. 5—GD Power Pumps robbed, $50.00 ea. Patridge, Cities Service Oil Co., Bartlesville, Okla.

FOR SALE: 12 K.W. Portable Light Plant Powered by 35 H.P. International Engine. Melton Supply Co., Seminole, Okla.

40,000 Feet 1-inch used galvanized pipe, reconditioned. Price 8c per foot f.o.b. Shreveport, La. American Pipe & Supply Co., 2335 Texas Ave., Shreveport, La.

Reconditioned, Tested and Guaranteed
Gate Valves for sale. Large stock, sizes 16" to 2", flanged end and screw end, various pressures.
Stock List and Prices on Request.
THE GATE VALVE SHOP
120 Tuke Box 1936
Pampa, Texas

25 K.W. and 40 K.W. Gas Engines, 220 volts, D.C. Two 100 K.W. Gas Engine-Generator Sets, 220 volts, D.C. 7x6 Ingersoll-Rand ER-1 Air Compressor. Six-inch Oster Pipe Threading Machine. Also large stock of lathes, pipe machines, milling machines, etc. Send for our list.
Terms to suit.
CINCINNATI MACHINERY & SUPPLY CO
26 West 2nd St., Cincinnati, Ohio.

FOR SALE 38 x 7, 40 x 8, and 10.50 x 24 used tires and tubes. Patridge, Cities Service Oil Co., Bartlesville, Okla.

FOR SALE: 1 Askenia Type Magnetometer #7970, $750.00. Cities Service Oil Co., Bartlesville, Okla.—H. D. Patridge.

50,000 FT. 2" Line Pipe, Screw & P. E. Also 3". 4". 6". 8" and other sizes. Large stock of fittings. valves & other material. GILBERT PIPE & SUPPLY. Electra. Tex.

FOR SALE
COMPRESSORS
Complete Repressuring or Air Lift Plant for Immediate Delivery.
2—13 & 5½ x 12 Ingersoll-Rand XOB compressors 400# pressure V-belt driven by 120 H.P. Chicago Pneumatic 3-cylinder vertical gas engines.
2—12 & 7 x 10 Chicago Pneumatic 400# pressure vertical compressors direct connected to 120 H.P. 3-cylinder Chicago Pneumatic vertical gas engines complete.
Used very little — excellent condition. Located on original foundation in Louisiana.
EARL E. KNOX COMPANY
Erie, Penna.

7" x 30' STEEL RIVETED Horizontal Storage Tanks. Also towers, vessels, etc. GILBERT PIPE & SUPPLY, Electra, Tex.

FOR SALE: 7¼ x 18 O. W. S. Mud hog slush pump, with 16 groove sheave, new liners and valves. Good condition. Located at Longview, Texas. Superior Oil Corp., Tulsa, Okla.

FOR SALE: 6 x 16 Wilson-Snyder Power Slush Pump. Melton Supply Co., Seminole, Okla.

FOR SALE: Wilson-Mogul Drawworks with water cooled brakes and 100 H.P. International Motor. Melton Supply Co., Seminole, Okla.

FOR SALE: Complete drilling outfit, #3 National Machine with engine, winch truck and four wheel trailer, water tanks, drilling lines, tools 18" to 6", 3,000' 7" casing all in excellent condition. Address inquiries to Box B-185, The Oil and Gas Journal, Tulsa, Okla.

FOR SALE
55000 bbl. Steel Tank
5000 bbl. Steel Tank
Tidewater Equipment & Mac'y. Corp.
305 Madison Ave., New York, N. Y.

FOR SALE
3—125 HP 350 WP Acme Boilers
3—125 HP 325 WP Broderick Boilers
2—125 HP 250 WP Donovan Boilers
10,000 Ft. 4" API Full Hole Drill Pipe
4,600 Ft. 4" Acme Full Hole Drill Pipe.
Major Tool & Supply Co., Okla. City, Okla.

DIESEL—GAS—ENGINES
Large selection — All sizes and types. Generator units, marine engines, gasoline engines, auxiliaries—boilers, steam engines, and turbo-generator sets.
Complete information on request.
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ROTARY PUMPS

One Viking ET-4 rebuilt direct connected to 2¾ to 1 gear reducer. 150-200 gpm. 100 pounds.

One 4" Worthington high pressure type GR. 120 to 200 gpm. 300 pounds maximum pressure.

New pump performance guaranteed.
CORKEN PUMP & MACHINERY CO.
206 East Grand Oklahoma City

FOR SALE: 27½" Ideal Rotary Table, 5 sheave 200 ton Crown Block, 4 sheave 72" traveling block, 8" Ideal enclosed rotary hook. Melton Machinery & Supply Co., Seminole, Okla.

For Sale—Equipment

FOR SALE: F. O. B. Oklahoma Shipping point, 35,000 feet 6⅝" O. D. plain end, double length line pipe.
CENTRAL SUPPLY CO.
109 No. Elgin Phone 3-7552 Tulsa, Okla.

3" x 4" F&M Power Pump in excellent condition. Also Centrifugal & Steam Pumps. Gilbert Pipe & Supply, Electra, Tex.

3—150-HP 150# Working Pressure horizontal Return Tubular Boilers with breeching, in good condition; also unusually good stock of three, four and six inch valves and fittings for refinery and pipe line service. Call or write Eason Oil Co., Enid, Okla.

FOR SALE — OIL STORAGE TANKS
6—31,000 bbl. with breather roofs.
3—31,000 bbl. without roofs.
In first class condition — ready for immediate delivery.
1—Parkersburg SC-11 Pumping Unit, Stroke 5' to 11'.
JOS. GREENSPON'S SON PIPE CORP.
National Stock Yards (St. Clair County), Illinois.

FOR SALE: 1—100 HP Fairbanks-Morse Diesel Drilling Engine in good condition. Box B-192, The Oil and Gas Journal, Tulsa, Okla.

FOR SALE: One complete Thrift Hydraulic Pipe Pulling Outfit. Cheap. F. O. Wilkins, 201 Commerce Building, Mt. Pleasant, Michigan.

FOR SALE: 2—175 H.P. Heinie water tube boilers in first class condition, complete with all connections, 30-ft. steel breeching and 80-ft. riveted stack. East Texas Pipe & S. Co., Kilgore, Texas.

20" x 12" ING. Rand Vacuum Pump. Also Compressors, Gas Engines, Bessemer parts. Gilbert Pipe & Supply, Electra, Tex.

WE HAVE in stock for immediate shipment:
15 HP., Fairbanks-Morse Oil Engine.
25 HP., Tips Oil Engines.
40 HP., Tips Convertible Engines
40 HP., Tips Gas Engines
50 HP., Tips, 2 cyl., Oil Engine.
120 HP., Tips, 3 cyl., Oil Engine.
TIPS ENGINE WORKS
Austin, Texas.

LINE PUMPS
Two—2½" 4 stage Byron Jackson multiplex with 150 h.p. motors and controls.
CORKEN PUMP & MACHINERY CO.
206 East Grand Oklahoma City

FOR SALE: 2—75 H.P. Fairbanks-Morse Type Y Oil Engines. Patridge, Cities Service Oil Co., Bartlesville, Okla.

FOR SALE: Complete Wilson Portable Rotary Rig with telescoping mast, suitable for 2,000 ft. drilling. Melton Machinery & Supply Co., Seminole, Okla.

FOR SALE: 2—470 HP Natl Transit Gas Engines direct connected to 14¼ x 36" Ingersoll-Rand Compressors. Emco Equipt. Co., 1st Natl Bldg., Oklahoma City, Okla.

FOR SALE: 7¼ x 14 Oil Well Power Slush Pump. Melton Machinery & Supply Co., Seminole, Okla.

FOR SALE: At Oklahoma City six #1 Smith 4' 6" x 16' Standard Oil and Gas Separators. Patridge, Cities Service Oil Co., Bartlesville, Oklahoma.

FOR SALE

We offer 523, 55-ton all-steel, self-clearing DOUBLE HOPPER CARS consisting of:

160 USRA construction; built 1921-1922; with A-B brakes; 1880 cubical feet capacity.
363 built 1910-1915; with KD-1012 brakes, 1683 feet capacity.

ALL HAVE FULL "U" CAST STEEL TRUCK FRAMES.
Purchaser must buy all.
PRICE: $1700.00 each f.o.t. Pennsylvania
TERMS: Cash with purchase.

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1446 Guinotte . . . Kansas City, Mo.

Journalisms:

THE author of the series in the Engineering and Operating Section, which is concluded in this issue, "Fabricating Piping Systems by Electric-Arc Welding," A. M. Hill,

A. M. HILL

was born in Iowa and grew up and attended schools in Cherryvale and Independence, Kans., where his father was a drilling contractor from 1902 to 1907, operating in the Cherryvale and Coffeyville, Kans., and Nowata, Okla., pools. Mr. Hill's first experience in the oil business was dressing tools on a rig which was not owned by his father. He obtained welding experience in shops in Hutchinson, Kans., while employed as an automobile mechanic in 1919 and 1920. His first job in pipe lining came in 1921 when he went to work for Prairie Pipe Line Co., on one of the first oil lines to be constructed by welding. This was between Mexia and Jacksboro, Tex. After a year with Prairie, he spent a year with Oklahoma Natural Gas Co. in the machine shop at Tulsa, and then with his present organization, Stanolind Pipe Line Co., which was then known as Sinclair Pipe Line Co., in 1923.

Mr. Hill's first work with the Sinclair organization was at the fabricating shop which the company maintained between 1922 and 1927 at Humboldt, Kans. Early in his welding career, Mr. Hill qualified as an operator in both oxyacetylene and electric welding. His promotions came as follows: 1927, chief welder, in which position he served as welding foreman and inspector of pipe-line construction; 1930, when Sinclair Pipe Line became Stanolind Pipe Line, welding superintendent, and 1939, superintendent of line maintenance.

READERS who have been tormented lately with chemical terms that seem to mean so much to the scientist and so little to the average oil man will soon have an opportunity to face the scientists on even ground. The Journal is preparing a glossary of such terms and in a series of several pages will offer a simple, yet, accurate and appropriate explanation of each.

PLYWOOD, which is coming to the fore with all sorts of new uses because of the shortage of metals, has been adopted by at least one oil company for its drums for use in marketing greases. The company estimates that the substitution of these "Victory" drums will save 2,000 tons of steel a year formerly required for packaging heavy lubricants. The only metal in them is the fasteners holding ends of the laminated sheets together, and in a ring for use in lifting the removable lid. The inner surface is lined with a chemical which prevents greases from creeping through pores in the wood. Just another example of the oil industry's ingenuity, and it willingness to go all-out in the war effort.

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CALENDAR

August

WESTERN PETROLEUM REFINERS ASSOCIATION, technical meeting, North Louisiana group, Shreveport, La., August 14.

September

NATIONAL PETROLEUM ASSOCIATION, annual meeting, Hotel Traymore, Atlantic City, N. J., September 16-18.

October

INTERSTATE OIL COMPACT COMMISSION, autumn meeting, Palmer House, Chicago, Ill., October 1-3.

AMERICAN INSTITUTE OF MINING AND METALLURGICAL ENGINEERS, regional meeting, St. Louis, Mo., October 2.

NATIONAL SAFETY CONGRESS and EXPOSITION, Palmer House, Chicago, October 5-9.

TEXAS MID-CONTINENT OIL AND GAS ASSOCIATION, twenty-third annual meeting, Dallas, Tex., October 8-10.

WESTERN PETROLEUM REFINERS ASSOCIATION, technical meeting, Wichita, Kans., October 9.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS, fall meeting, Rochester, N. Y., October 12-14.

INDIANA INDEPENDENT PETROLEUM ASSOCIATION, fall meeting, Hotel Severin, Indianapolis, Ind., October 14-15.

AMERICAN INSTITUTE OF MINING AND METALLURGICAL ENGINEERS, Petroleum Division, Hotel Ambassador, Los Angeles, Calif., October 14-16.

INDEPENDENT PETROLEUM ASSOCIATION OF AMERICA, thirteenth annual convention, Wichita, Kans., October 19-21.

NATIONAL STRIPPER WELL ASSOCIATION, annual meeting, Wichita, Kans., October 19.

SOCIETY OF AUTOMOTIVE ENGINEERS, Mid-west Fuels and Lubricants regional meeting, Tulsa, October 22-23.

NATIONAL LUBRICATING GREASE INSTITUTE, tenth annual meeting, New Orleans, La., October 25-29.

AMERICAN INSTITUTE OF MINING AND METALLURGICAL ENGINEERS, Petroleum Division, Austin, Tex., October 29-31.

WESTERN PETROLEUM REFINERS ASSOCIATION, technical meeting, Shreveport, La., October 30.

November

AMERICAN ASSOCIATION OF PETROLEUM GEOLOGISTS, Los Angeles, Calif., November 5-6.

CALIFORNIA NATURAL GASOLINE ASSOCIATION, Los Angeles, Calif., November 6.

AMERICAN PETROLEUM INSTITUTE, twenty-third annual meeting, Palmer House, Chicago, Ill., November 9-13.

AMERICAN INSTITUTE OF CHEMICAL ENGINEERS, thirty-fifth annual meeting, Netherlands Plaza Hotel, Cincinnati, Ohio, November 16-18.

AMERICAN CHEMICAL SOCIETY, national chemical exposition and national industrial chemical conference, Sherman Hotel, Chicago, Ill., November 17-21.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS, annual meeting, New York, November 30-December 4.

December

PETROLEUM ACCOUNTANTS SOCIETY OF OKLAHOMA, Hotel Mayo, Tulsa, December 17.

1943

February

AMERICAN INSTITUTE OF MINING AND METALLURGICAL ENGINEERS, New York, February 15-18, 1943.